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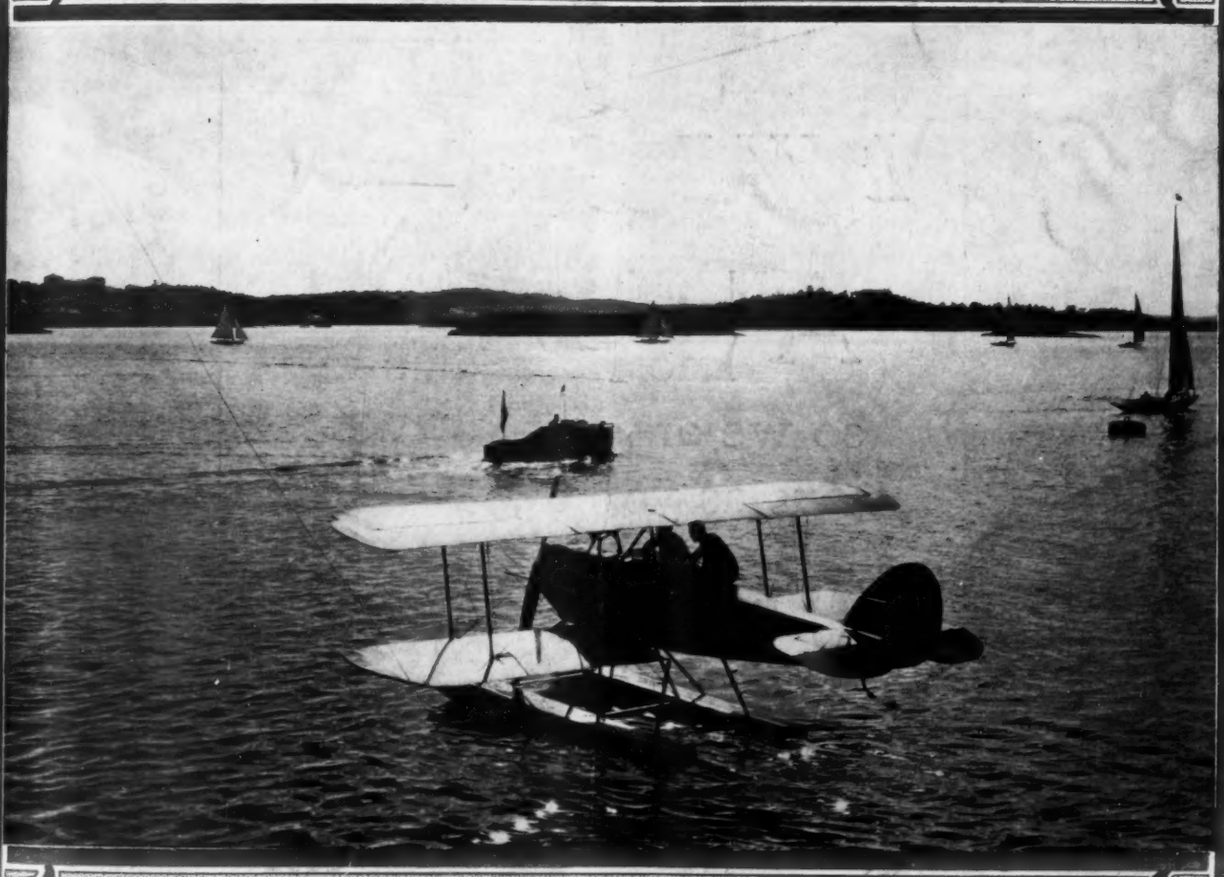

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VOLUME XXII

NUMBER 8

SPECIAL FEATURES

THE HEAT TREATMENT OF DURALUMIN
THE DERULUFT AIRLINE TO MOSCOW
AERONAUTICS BRANCH APPROPRIATIONS

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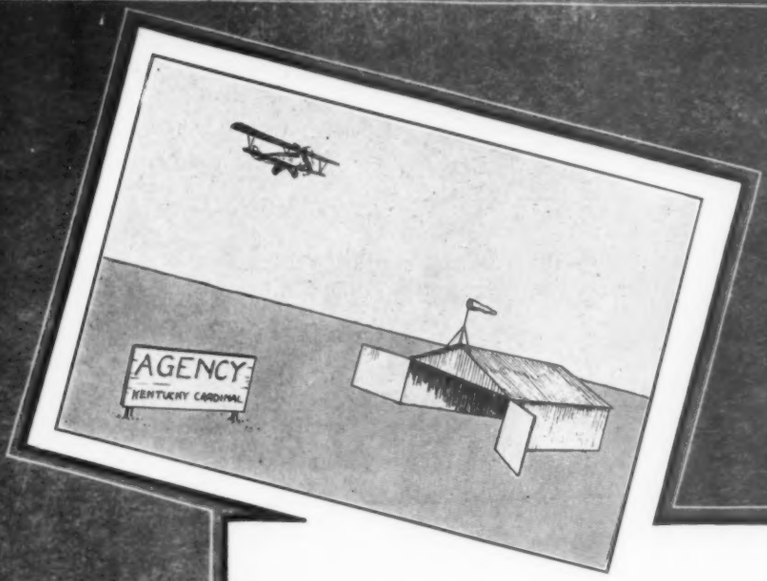

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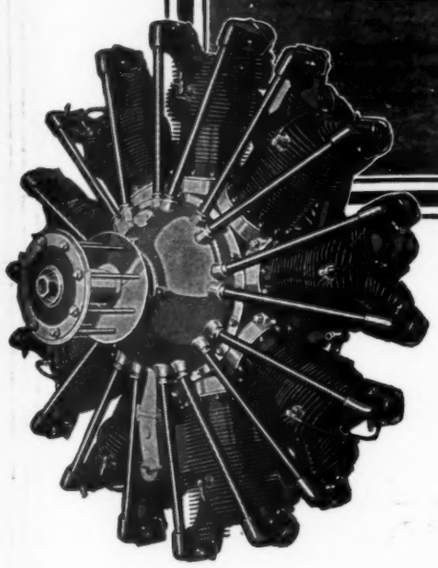

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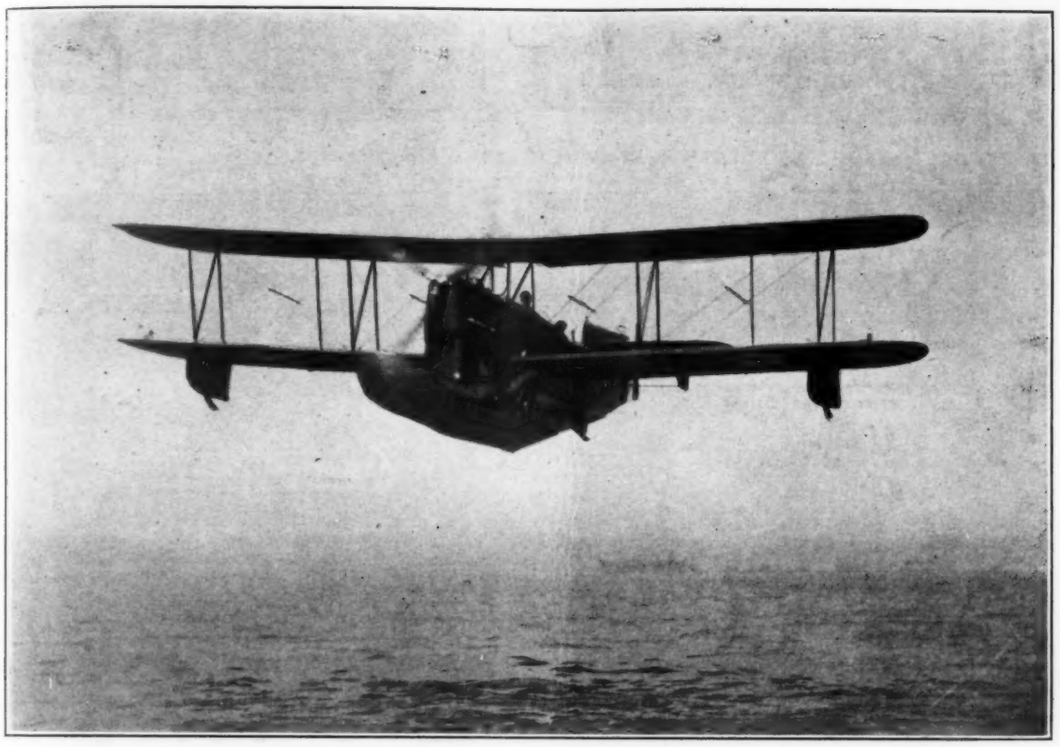

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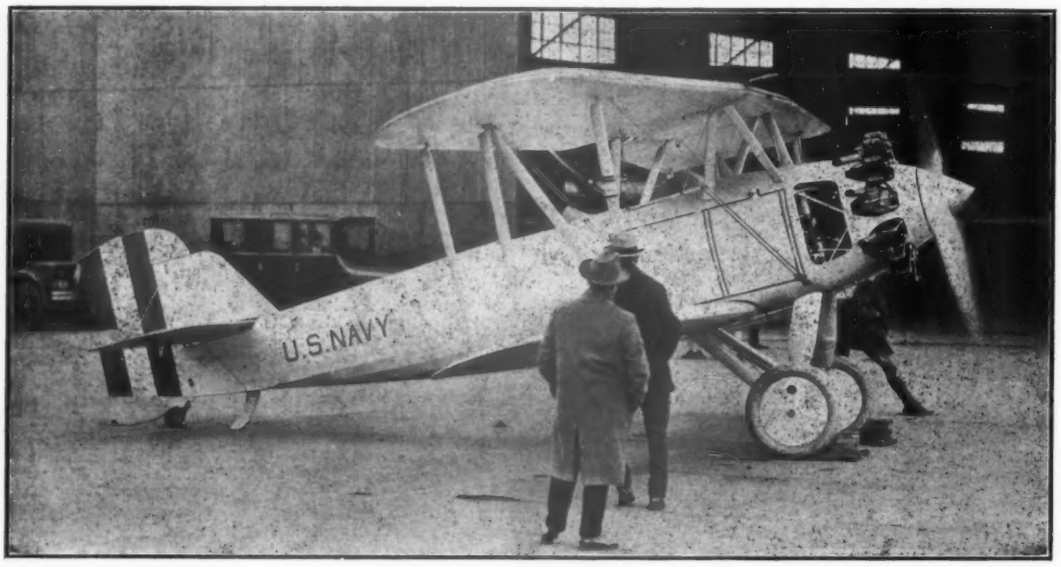

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With the Editor

During the past few months, AVIATION has had the opportunity of publishing several highly interesting articles on the general subject of duralumin. These articles, we are glad to say, have brought forth a good deal of favorable comment. There is no doubt that, while duralumin is being used very extensively in many spheres of aircraft construction, the actual information which has been circulated regarding the peculiar properties of this material—and it most certainly has peculiar properties—has been limited. The use of duralumin in aircraft manufacture is, undoubtedly, going to extend and the more engineers and designers know regarding its properties the broader will be their application of this alloy.

One of the major problems to be faced in the working of duralumin is its heat treatment. It may, in fact, be said that the secret of duralumin in aircraft construction is in its successful heat treatment. In this issue of AVIATION, the heat treatment of duralumin is discussed in detail by the same competent authority who has previously given readers the advantage of his experience in this subject.

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AVIATION

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The New Air Mail Rates

THE NEW air mail rate of 10 cents per half ounce between all points within the United States, regardless of distance and route, seems destined to have a very marked bearing upon the extent to which the air mail facilities are going to be used in the future by the public. In the past, the matter of mailing a letter by air was a complicated one. The air mail system in this country has extended rapidly and, as the system has grown, new and adequate provisions have had to be made to meet new conditions and the result has been a certain amount of lack of uniformity, especially in the air mail postage rates. It has sometimes cost more to mail a letter of a given weight over a certain distance than to mail another letter of the same weight over a considerably shorter distance, the reason being that in the first place, perhaps, a contract route was included in the itinerary of the letter, while in the second, the entire distance was covered on the Government operated route.

The first concrete step taken as a foundation upon which a uniform rate of postage might be established later was the passage of the measure which permitted the Postmaster General to pay for the carriage of mail under contract by the pound instead of on the percentage of revenue which necessitated a count of individual letters. The effect of this was at first felt only by the Post Office organization since it simplified to a degree the difficulties attached to the careful and laborious counting of letters sent by air over contract routes. However, it is very largely this measure which has enabled the establishment of the flat rate for the transmission of all mail by air, regardless of distance and destination.

The result, while it is too early for discussion with the aid of concrete evidence, without the slightest doubt will be marked by the vastly increased use of the air mail by both business houses and private individuals throughout the entire country. No doubt many a time has an individual desired to use the air mail but he has been deterred either by his own ignorance of the rates applying over the particular distance his letter was to travel or, upon inquiry at the local post office, the information he has received, if it has been accurate at all, has been so complicated that he has given up in disgust the idea of using the air mail.

Now, however, the system is simple. Business organizations which urgently need air mail in the economic pursuance of their business have now a system which is direct and devoid of complications. Furthermore, it is cheap. The result of the new flat rate should be a marked increase in the use of the air mail and a consequent rapid increase in the receipts of the air mail contractors who are among the pioneers of commercial air transportation in the United States.

Flying Salesmen

IN THE New York Times recently, there appeared some correspondence relating to the use of airplanes by salesmen and directed towards the placing of the honor for the first such employment of aircraft. The correspondence recalls the occasion in 1919, when a certain large commercial corporation sent one of its salesmen on a trip by plane and, as a result, secured $10,000. worth of business in four days, and goes on in a manner which would indicate the belief that the airplane, as a means of transportation for salesmen, was somewhat of a new idea—all of which is really rather absurd in view of the comparatively extensive use to which airplanes have already been put in the field of salesmanship.

The real facts undoubtedly are that the airplane has been used intermittently for at least the past ten years and probably more by commercial travelers and salesmen from the standpoint of its publicity value, and there is, at the present time, quite an appreciable amount of flying being done by commercial travelers.

It would be quite superfluous to enter in detail into the possibilities of the small airplane as a means of transportation for salesmen for these are all too apparent. It is important, however, to mention that the reason flying has not been used more extensively by commercial travelers is that there are not yet sufficient airports in the country located in close proximity to the cities and towns to which the flying salesman would wish to go. It is never difficult to find a reason in support of the plea, "Build more flying fields", and here we have one of the most convincing arguments in favor of every municipality having its airport.

By Sea and Air

THE RECENT report to the effect that a contract has been signed whereby mail from France addressed to the Argentine will be speeded by air again lays stress upon a contention regarding the future of commercial aeronautics which is not by any means new but which will stand repetition. There is, with little doubt, a very real future for the employment of aircraft in conjunction with present means of transportation. Many long sea journeys may be shortened by the use of seaplanes at the extremities of the route or aircraft may be employed over certain section of a route with a view to speeding up transit. In either case, the advantages are that in the pioneer stages of air transportation, the burden on commercial aviation is not so great as it would be if the entire transportation system in question were dependent solely upon flying.

The Heat Treatment of Duralumin

By WM. NELSON
Lieut. Comdr. (CC), U.S.N.

WHEN CERTAIN light aluminum alloys are heat treated, quenched and aged there is considerable improvement in their tensile properties. This remarkable phenomena was first discovered in the case of duralumin by Wilm and has been described at length by him and by others.

When duralumin is heated to a temperature of about 500 deg. C. and quenched in water there is a period immediately after the quenching when the material increases in hardness, and tensile strength with time. After several days the duralumin attains relatively constant hardness and tensile properties. This period after the quenching is known as the aging period and the material is said to be aging or maturing. It is this feature that places it in a different category from the steels insofar as heat treatment is concerned.

Duralumin is a high strength aluminum alloy and attains that classification through its heat treatment much in the same way as the high strength steels attain their properties through correct heat treatment. And although other aluminum alloys can be heat treated to produce desirable characteristics, duralumin is outstanding in its variety of practicable uses through the particularly good qualities obtained by relatively simple treatments.

Cast duralumin responds somewhat to heat treatment, but the form in which this alloy is used is as a wrought product so our discussion will be confined to the latter. It is supplied in strip, plates, angles, special shapes, tubes, forgings, etc. and all respond to the same heat treatment practices.

Two Methods

There are two very useful heat treatments given to duralumin; namely, annealing, and heat treating to produce the high physical properties for which this alloy is outstanding. To avoid confusion the term "annealing" will be used to mean the softening of the material to put it in the best state for cold working. To keep duralumin soft and workable over a period of time and to attain the greatest amount of softness for all forms of cold working it can be annealed by heating to about 350 deg. C. (660 deg. F.) and allowing it to cool in air. The term "heat treating" will be used to mean the heating of duralumin to a temperature sufficient to bring out the best tensile properties by subsequent aging. The heat treating temperature of duralumin is 490 deg. C.—510 deg. C. (915 deg.—950 deg. F.). These two treatments are used very frequently in the manufacture of duralumin products and in order to obtain results that are consistent the temperature control must be accurate.

The physical properties of duralumin in these standard tempers and in an unaged temper are given as follows:

Condition of Material	*Tensile Strength, Lb. per sq. in.*	*Yield Point, Lb. per sq. in.*	*Elongation % in 2 in.*	*Scleroscope Hardness*
Annealed	25-35000	9-10000	10-14%	9-12
Heat treated and aged	55-63000	30-36000	18-25%	23-27
Heat treated and unaged	46-52000	—	18-25%	10-13

Theoretical Discussion

When duralumin is normalized after any initial wrought condition by heating to 500 deg. C. and cooled in water, oil or air, the material is in a relatively soft condition resembling annealed metal. However, as the alloy is allowed to stand at room temperature it increases in hardness, and tensile strength rather rapidly, eventually reaching a point where the increase is not great for protracted periods of time. This peculiarity of aging has caused considerable discussion amongst metallurgists and has been investigated extensively to determine the exact cause. The theories on which the hardening with time is based are complicated, to say the least. Duralumin aged at very low temperatures such as that of liquid air does not harden with age. It is, therefore, an opinion that the aging process is a heat treatment that takes place at room temperature.

Before going to the chemical metallurgical phases of the heat treatment process it is proposed to discuss the effect on the physical properties brought about by varying the temperature of heat treatment, the temperature of quenching, and the period of aging.

Duralumin sheet, as it comes from the rolls, has a tensile strength of 38-48000 lb. per. sq. in. with an elongation of about 2 per cent in 2 in. These values, of course, depend on the reduction made in the sheet and are, therefore, only representative. However, it is from this approximate condtion that the final properties are produced.

In Fig. 1 there are shown the ultimate tensile strengths, elongations, and hardnesses obtained from duralumin sheet heated at varying temperatures, quenched in boiling water and

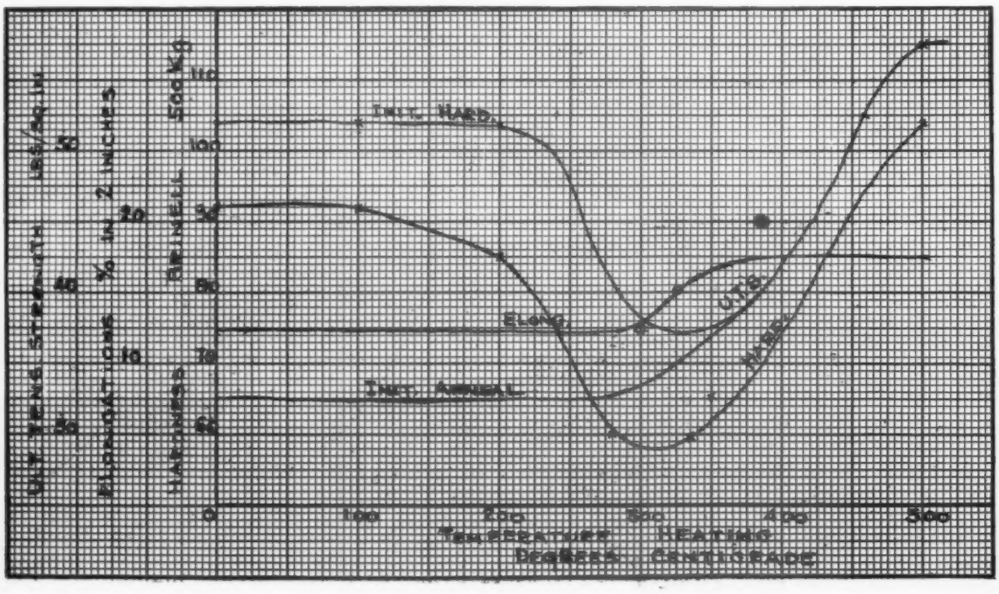


Figure 1—Effect of heating duralumin to varying temperatures, quenched and aged.

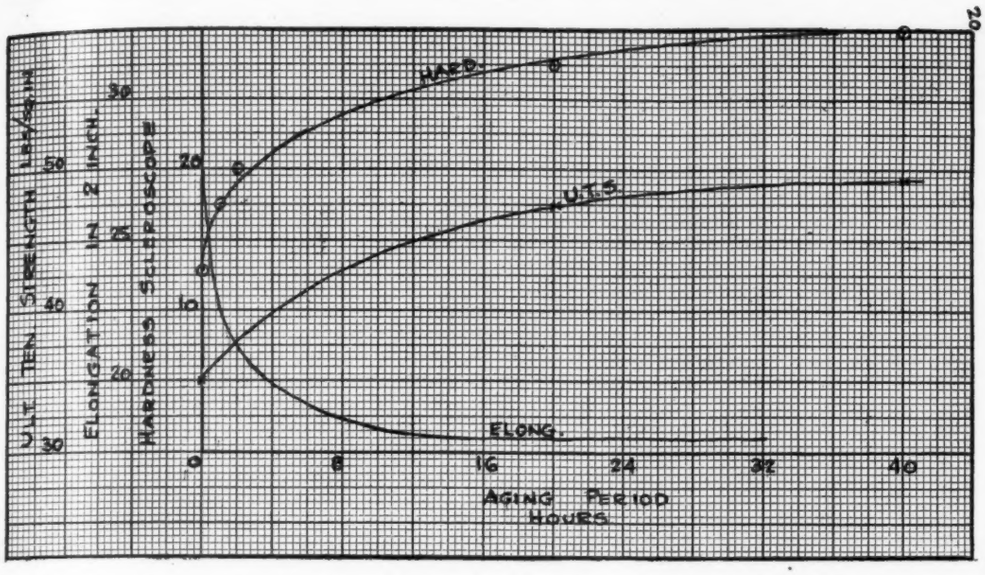


Figure 2—Effect of time of aging. Duralumin heat treated and quenched. From 500 deg. C.

aged about five days. The material used was initially in the heat treated state giving the values obtained below 300 deg. C. There are two points on the tensile strength and hardness curves of particular interest. These are the low values obtained by heating to about 320 deg. C. and quenching and the high values obtained by heating to 500 deg. C. and quenching.

The effect of heat treating up to about 350 deg. C. is to produce a relatively soft material. From 350 deg. C. up to 520 deg. C. the hardness increases with increase in the heat treating temperature so that practically any desired hardness can be produced in duralumin by heating to a determined temperature, quenching, and aging. Above 520 deg. C. blistering of the metal occurs indicating the approach of the melting point. Blistering will occur in some duralumin below this temperature but it is believed to be due to the constitution of the particular pieces that act in that way rather than being representative. To produce the best results the heat treating temperature should be high enough to insure the solution of the magnesium-silicon and copper-aluminum compounds and that temperature is about 490 deg. C.—510 deg. C.

Quenching

It is natural to suppose that variations in the medium used for quenching and the temperature of that medium may cause different results. However, there apparently is little or no effect on the physical properties produced by varying the temperature of quenching within the ranges tried. It has been noted, however, that quenching to a low temperature, say 10 deg. C. that the metal is softer immediately after the quench than is the case where higher temperatures have been used. The ordinary quenching mediums are air blast, water, and oil. The physical properties resulting from an air blast quench are slightly less than those obtained by a liquid quench. Oil and water produce about the same results. The reason for using various mediums for quenching is dependent on the working of the metal to be done and on its relative ability to resist corrosion.

Two factors come into the aging process; namely, temperature of aging and time of aging. In Figure 2 there are given curves showing the effect of aging on the physical properties. These curves have been corroborated by several investigators so there is little left to be questioned regarding their form. Quenching at 100 deg C. and aging at room temperature seems to accelerate the aging process. It has been noted that the rate of hardening increases as the temperature of aging increases, that the maximum hardness is obtained by aging at temperatures above 100 deg. C. and that at aging temperatures above 140 deg. C. the hardness eventually drops after reaching its maximum.

Aging is practically complete after about four days although there is reason to believe that some changes take place for very long periods over that. During the early part of the aging period it is practicable to work duralumin rather extensively without impairing the material. This factor is taken advantage of in various ways, some of which will be described below.

The chemical composition of duralumin is: Copper, 3.5 to 4.5 per cent; Magnesium, .4 to 1.0 per cent; Manganese, .0 to .7 per cent; Iron, .4 to 1.0 per cent; Silicon, .3 to .6 per cent; Aluminum, remainder. This combination permits of a variety of possibilities in the final product making the chemical-metallurgical theory uncertain. The effect of adding small quantities of other metals such as nickel, tin, chronium, etc. is not great and can in general be disregarded.

Alloys in Duralumin

The binary alloys formed in duralumin and to which the effect of heat treating and aging are ascribed are Mg_2Si and $Cu\ Al_2$. Alloys which contain only the copper-aluminum group show very little aging effect but do show an appreciable hardening effect. Likewise the alloys containing the magnesium—silicon group without the copper show marked aging effect. It is, therefore, possible that the $Cu\ Al_2$ produces the initial hardness when heat treated and quenched and that Mg_2Si produces the increase in hardness during aging at room temperature, by dissolution of these constituents.

Considering first the compound $CuAl_2$ and its effect on the initial hardness—tests conducted at the Bureau of Standards places the solubility of $CuAl_2$ in aluminum at 4 per cent at 500 deg. C. and 1 per cent at 300 deg. C. by quenching. Accordingly, if the temperature is reduced slowly from 500 deg. C. the $CuAl_2$ that was in solution will precipitate in a highly dispersed form resulting in duralumin that is relatively soft. Now, if the temperature is reduced from 500 deg. C. rather rapidly as by quenching, the $CuAl_2$ is held in part in solution producing a relatively hard alloy. Now, if the metal is held at room temperature over a period of time, the $CuAl_2$ tends to precipitate, bringing about equilibrium. This precipitation is undoubtedly in the form of very finely divided particles. If the duralumin is aged at a low temperature (180 deg. C.) the hardening does not take place, due undoubtedly to the absence of any precipitation. The annealing is assumed to result from the coalescing of the finely divided particles of $CuAl_2$.

Magnesium

Theorists differ on the relative importance of $CuAl_2$ and Mg_2Si in duralumin. The Mg_2Si acts in very much the same way as has been described for $CuAl_2$ if that is the constituent producing the effect, so for all practicable purposes each is a necessary compound producing its effect by precipitation in a dispersed form. However, increasing magnesium beyond that necessary to take up all the silicon reduces the solubility of the Mg_2Si at the higher temperatures.

The manganese in duralumin makes for better mechanical properties and although it may have a part in bringing out the hardening effect of $CuAl_2$ its addition beyond 1 per cent makes bending and forming difficult.

A balance between the various elements undoubtedly exists

and has in a way been investigated physically and metallographically. However, within reason the quantities given above seem to produce the most desirable qualities for the simple heat treatments used in practice.

Heating Apparatus

Heating of duralumin for heat treatment may be done in a furnace or in a salt bath. The primary requisite that the material be heated uniformly on all sides is the main function of the apparatus. The use of an open flame for heating is not satisfactory on account of the non-uniformity obtained by such means.

The use of a salt bath is, perhaps, the most common method in vogue. It has the disadvantage that thorough washing off of heat treated parts is necessary after heat treatment to insure that no salts are left on the duralumin. It has the same disadvantage over a furnace for parts which are to be worked hot. Salts left on duralumin tend to hasten corrosion.

The tank for containing the salt bath is made of a size dependent on the material to be heat treated. For ordinary medium size pieces a tank 4 ft. by 3 ft. and 3 ft. deep is convenient. For longer pieces a long tank about 2 ft. wide and 4 ft. or 5 ft. deep is most suitable. The tank is built up of ½ in. or ¾ in. mild steel plates, calked and otherwise made water tight. Built around the bath and acting also as a foundation for the tank is a brick furnace. This furnace can be heated by electricity, oil, or gas. Coke, coal or charcoal furnaces are not used owing to the formation of explosive mixtures when carbonaceous fuel gases come into contact with nitrates. The necessary features of the furnace are a uniformity of temperature in all parts, a ready control of the temperature by the operator and an equalization of heat distribution around the bath. In cases where deep tanks are used baffles must be arranged around the furnace to keep the flames from making direct contact with the tank, and in all cases the baffles should be so arranged that the salts will begin to melt along the side near the top so that relief will exist for expansion of the salts.

The salt bath is composed of approximately equal parts of sodium nitrate and potassium nitrate (commercially double refined). In adding salts to the molten bath care should be exercised as the presence of moisture causes spattering of the liquid. The usual procedure is to add salts when the bath is cold. The melting point of this bath is about 260 deg. C. It is possible to use sodium nitrate alone but since material becomes coated with a salt crust after having been immersed in such a bath it is better practice to use sodium nitrate and potassium nitrate.

Equipment

A platform should be provided around the furnace at the height which will make it convenient to handle the material being heat treated into and out of the bath. Cranes and such other equipment as are necessary for handling the charges should be considered. In order to avoid any damage to the parts means must be provided for supporting the duralumin after heat treatment since it is easily distorted and bent by its own weight while hot. Baskets made of strip or wire mesh serve the purpose well. They are also convenient for the quenching operation.

A very convenient means for handling rivets is to use a tube blanked at one end and long enough to submerge about 1½ ft. into the bath. This also avoids placing the rivets in direct contact with the salts while being heated. Appliances used about a galvanizing plant find ready use in a heat treating plant for handling material, etc. Covers for the baths allow a bath to be heated up quickly when desired.

The pyrometric equipment is perhaps the most important installation. In a small bath one pyrometer is considered sufficient, whereas in a large bath two or three may be essential. All pyrometers should be permanent installations and should be of the recording type. The necessity for accurate temperature control is so important with duralumin that all practicable means to insure no deviations should be employed. A check on the pyrometers should be made weekly and no error in excess of 10 deg. F. should be permitted. Slight errors in the temperatures may cause very undesirable results.

The salt mixtures are kept at the temperature ranges used for annealing or heat treating duralumin. In order to avoid changing the temperature of a tank to suit both the annealing and the normalizing temperatures it is the practice to keep one long tank and one small tank at the heat treating temperature and a medium size tank at the annealing temperature. This arrangement will meet most conditions. Another means for avoiding the raising and lowering of temperatures for short periods is to do the annealing at night and the heat treating during the day using one bath for both operations.

The quenching tanks are of wood or steel. Steam coils or other means must be provided for controlling the temperature of the quenching medium. These tanks are of the same size as the salt bath; and are fitted with the usual accessories such as inlet, overflow and drains. They are fitted with platforms to facilitate operation and are located conveniently to the heat treating furnaces so that quenching can be done immediately after heating. Baskets, tubes, etc. which are used for heat treating and quenching should be dry before they return to the salt bath on account of dangers to the operator through spattering of salts when moisture comes into contact with the salt. Some salts are carried over to the quench from the heat treating tank, the only effect being to raise the boiling point of the water.

On account of the suspicion that attaches to the corrosion of duralumin which has been heat treated in salt bath, there has been a tendency to turn to the use of electric or oil furnaces for heating this material. For long pieces the electric tube furnace with quench tanks immediately below is perhaps the best. For other parts the ordinary muffled or semi-muffled electric furnace suits. Coils and circulating fans to insure a uniform temperature in all parts are the major essentials. These furnaces as a rule are fitted with automatic temperature control devices. Oil fired furnaces have been used with considerable success. The combustion chamber is on each side of the heating space with connection between the two at the top only. There is no reason why the oil furnace should not be very efficient excepting alone the question of uniform temperature with accurate control.

Annealing

In order to keep duralumin soft enough to be worked cold it is annealed by heating to a temperature of 350 deg. C.—380 deg. C. (660 deg.—715 deg. F.) and cooled in water, air or in the furnace. In this state it is "dead soft." This state results in all cases regardless of the initial temper of the material. The effect is permanent and the properties remain constant unless the metal is subjected to working or subsequent heat treatment. It is in this temper that the alloy is most plastic and subject to the easiest working. The annealed condition should not be confused with the best condition for hot working of duralumin for they may not be the same.

The length of time the metal is held at the annealing temperature and the length of time allowed for cooling affect the degree of anneal. It is essential that the material be thoroughly soaked at the annealing temperature and cooled very slowly to obtain the softest condition. For sheets and shapes less than 1/10 in. in thickness the length of time to anneal in a salt bath varies from 10 min. to 30 min., whereas in a furnace the period is from four to ten times as long. Heating the material longer and oftener than necessary apparently has no effect. Thick sections of duralumin should be heated long enough for complete soakage.

It is the usual practice to wash off in hot water parts which have been annealed in a salt bath to remove all traces of the salt.

When in the annealed state, duralumin can be drawn, stamped, formed and otherwise worked until the metal becomes hard through mechanical working. Reannealing can be resorted to as often as is desirable to keep the material in condition for further working. After the completion of such working heat treatment at the normalizing temperature restores the physical properties to high strength classification.

Heat treating duralumin at a temperature above the annealing temperature tends to bring the material into a state where it indicates hardening and aging qualities. Care should therefore, be taken to maintain the metal within the ranges specified.

It is not always necessary to anneal duralumin to put it in condition for working, for there are many operations which can be done during the aging period after heat treating at the higher temperature. This in such cases eliminates one of the heating operations.

Heat Treating

Duralumin is heat treated for normalizing at 490-500 deg. C. (915-930 deg. F.). The material is held at that temperature for a period long enough to become thoroughly saturated. This period varies depending on the thickness of the piece. The following formula can be used to determine this time for a salt bath.

Time in minutes=$60\sqrt{\text{thickness in inches}}$. In the case of a furnace the time is dependent on the conditions, a uniform heat for twenty minutes being sufficient. It should be noted that duralumin heats up rather rapidly and that pro longed periods of heating do not materially effect the temper.

There is, however, one important consideration during the heat treating of duralumin that bears comment. During the period that the material is hot it must be properly supported to avoid distortion due to sagging. The metal will, of its own weight, tend to sag and in all cases where the parts are large whether heated in a bath or a furnace special attention to the support must be given.

In furnaces due to unequal distribution of heat duralumin will in some cases be burned. The material when so burned is irreparably damaged. Inspections of heat treated parts must be done with care to locate such damaged duralumin to be certain that the finished product has the desired features.

Heat treating of a piece in sections should not be undertaken for the part between the cold end and the furnace or bath will be partially annealed.

Heating duralumin in a nitrate bath colors the material in a variety of hues. This discoloration is superficial and is not an indication of defects nor any particular inherent properties.

Quenching

The quenching is ordinarily done in water. Quenching in boiling water accelerates aging. Quenching in cold water leaves the material softer to start the aging process. Oil is also used as a quench in connection with duralumin heat treated in a furnace. Air blast or still air cooling are effective to avoid distortions that might take place in water quenching. However, metal quenched in air shows slightly lower physical properties when compared with metal quenched in cold water. Parts which are to be worked subsequent to heating should be quenched in cold water, whereas parts which are not to be worked should be quenched in hot water or air.

The time between removal from the heating medium and the quench should be a minimum and unless an air quench condition is desired this period should not exceed one half a minute.

All nitrates that collect on duralumin during heat treatment should be washed off in the quenching operation.

Immediately after heat treating at 500 deg. C. and quenching, the alloy is soft and pliable permitting a variety of fabricating operations. This softness leaves the metal on aging so that after about an hour the hardness has reached a limit where further working is done with difficulty. However, by undertaking the bending or forming immediately after quenching the work can usually be done before complete aging. No further heat treatment is necessary to parts so worked unless the working has been severe.

Quenching in water or oil usually distorts duralumin so that straightening and squaring are necessary. Any of this work required must be done soon after the quench during the soft state of the metal. Warping or buckling does not usually occur during the aging, so any stretching or straightening done will be retained.

The early aging period permits the driving of rivets without annealing. Rivets in all sizes up to about ¼ in. in diameter are heat treated at 500 deg. C. quenched in cold water and driven within an hour after the quenching. Rivets not used during this hour are usually returned for another heat treatment and so on. No ill effects are known to be attributable to this repeated heat treatment, although the rivets do seem to drive easier after a number of heat treatments. Rivets driven after this heat treatment and allowed to age attain the same temper throughout.

Material in the sheet form is supplied by the manufacturers in the annealed, heat treated, or hard rolled condition. Shapes may be supplied in the extruded condition if specified. These various conditions cause confusion in both the stores and in the shops and in a number of instances annealed material has been used where heat treated material was required. Skilled workmen can spot the condition by its working properties, but bend tests combined with scleroscope hardness tests usually indicate the condition beyond a doubt. A scleroscope hardness test should be in the shop inspection routine for every piece of duralumin going into final assemblies.

Conclusions

Very little of a novel nature has come out on heat treating duralumin in recent years and there is reason to believe that the practices are very nearly standardized. There is a leaning towards the use of electric furnaces for heat treating this alloy to reduce possible dangers of corrosion from the nitrate salts used in baths. This measure appears desirable but uniformity of heating and accurate control of temperature, both obtainable with salt baths, are very important factors.

Wright J-5 Engine in Endurance Test

Several J-5 Wright engines have been in flight service in excess of one hundred hours and have demonstrated distinct improvement over previous models. Supplementing the extensive laboratory testing at the plant of the manufacturer, the Bureau of Aeronautics recently initiated a full throttle endurance test of a J-5 engine. To avoid the necessity for operating in shifts, no attempt was made to conduct the test non-stop, the running being confined to normal working hours.

Up to the present, the engine has completed 105 hr. of full throttle operation, having been disassembled for inspection at the completion of 100 hr. The tests will be continued until some serious difficulty develops or a necessity for overhaul becomes apparent, neither of which contingencies are yet in sight.

"Plane Speaker" Tested Over New York

On the afternoon of Feb. 4 the Plane Speaker Corp. of Philadelphia, Pa. carried out a test of the "Voice from the Sky" over New York City. The pedestrians passing through Columbus Circle at approximately 3:30 p.m. were attracted by the sound of distant strains of music eminating from a Fokker three-engine plane flying at from 500 to 1000 ft. over head. The plane was carrying the full equipment of the "Voice from the Sky" which weighs approximately 1500 lb. and John Charles Thomas, concert baritone and one of the occupants of the machine hailed the people of New York City with popular airs which were plainly heard on the ground over the noise of the passing traffic.

Those who were at Philadelphia during the National Air Races will recall that a demonstration of the "Voice from the Sky" was given from the twin-engine Sikorsky plane Yorktown. The demonstration the other day in New York was equally successful and spells an interesting future for the device in many fields.

Among those of the aeronautical fraternity who were to be seen at Columbus Circle during the demonstration was Major Gen. John F. O'Ryan, president of the Colonial Air Transport which lent the machine for the present test.

Aeronautics Branch Appropriations Analyzed

Senator Bingham Shows Curtailments in Aeronautics Program of Department of Commerce Necessitated by Cuts in Budget Estimates.

RECENTLY, the Department of Commerce Appropriations Bill came up for consideration in the Senate and, on Feb. 4, some discussion was carried on concerning the reduction made by the House in the Budget estimates for the work of the Aeronautics Branch. The Senate finally restored to the Bill all the cuts which had been made in the estimates for administering the Air Commerce Act of 1926 and in support of this action, Senator Hiram Bingham (Connecticut) offered the following statement for publication in the Record. The significance of the statement lies in the fact that the Budget Bureau had already cut the original estimates considered absolutely necessary by the Department of Commerce for its aeronautical activities, and the House, in making further cuts, was making the Aeronautics Branch impotent to take care of the highly constructive measures contained in the Air Commerce Act. In setting down the respective sums involved in the whole discussion, Senator Bingham has very clearly and pointedly brought out the details of the plans of the Aeronautics Branch and has given some indication of how the taxpayer is certainly getting full value for the expenditures being made in the promotion of commercial aviation in the United States.—EDITOR.

Senator Bingham's statement follows:

1. The following table compares the Budget estimates with the allowances made in the bill as passed by the House:

Item	Budget estimates	House bill	Decrease
Aircraft in commerce	$796,250	$556,390	$239,860
Air navigation facilities	3,219,500	3,001,775	207,725
Total	4,015,750	3,568,165	447,585

Aircraft in Commerce

2. The appropriation "Aircraft in commerce" is available for all expenses of administration, apart from the establishment and maintenance of lights and other navigational facilities along air routes. This appropriation, in other words, is for the expenses of the information service required by the air commerce act, the expenses of registering and licensing planes and examining and licensing pilots and mechanics, the expenses of mapping the air routes by the Coast and Geodetic Survey, and the expenses of the scientific research carried on at the Bureau of Standards. Funds for mapping and for scientific research are allotted to the Coast and Geodetic Survey and to the Bureau of Standards, respectively, from this appropriation.

3. Both the Budget estimate and the House bill provided that a certain portion of the appropriation under this item should be immediately available—that is, available for expenditure during the fiscal year 1927 as an addition to the current appropriation. The Budget contained $168,000 for this purpose. The House reduced this amount to $111,500. The reduction made by the House, therefore, affects the 1927 program as well as the work for the fiscal year 1928.

4. The following table shows, for both 1927 and 1928, the amounts which would be available for the several activities which the appropriation "Aircraft in commerce" covers under the Budget estimate, and, comparatively, under the allowance approved by the House:

Program

Item	Budget estimate	House bill	Reduction
1927			
Appropriation already available	$250,000	$250,000	——
Added allowance in this bill	168,000	111,500	$56,500
	418,000	361,500	56,500
Estimated apportionment, by activities:			
Administration	55,000	55,000	——
Information	23,000	23,000	——
Registration and licensing	253,000	196,500	56,500
Mapping (Coast and Geodetic Survey)	7,000	7,000	——
Research (Bureau of Standards)	80,000	80,000	——
	418,000	361,500	56,500
1928			
Carried in this bill	628,250	444,890	183,360
Estimated apportionment, by activities:			
Administration	74,000	64,000	10,000
Information	40,000	35,000	5,000
Registration and licensing	377,250	224,890	152,360
Mapping (Coast and Geodetic Survey)	12,000	12,000	——
Research (Bureau of Standards)	125,000	109,000	16,000
	628,250	444,890	183,360

5. It will be seen that, so far as the current year's program is concerned, the entire cut made by the House occurs in the allotment for the division of registration and licensing. This is reduced from $253,000 to $196,500—a cut of $56,500.

6. In the 1928 program, the reduction made by the House is distributed to some extent over several of the activities which must be supported out of this appropriation, although the work of registration and licensing is again the most seriously affected. Ten thousand dollars would be taken off of administration, $5,000 off the information service, and $16,000 off of the experimental and research work being carried on by the Bureau of Standards. The division of registration and licensing is reduced from $377,250, as recommended by the Budget, to $224,890—a cut of $152,360, or 40 per cent of the Budget allowance.

Registration and Licensing

7. In regulating the use of aircraft for commercial purposes the department is required to register all aircraft engaged in interstate or foreign commerce and such purely intrastate aircraft as may apply for registration. It is required to rate registered aircraft as to their airworthiness, and to that end must, of course, inspect each plane or dirigible not only at the time of rating but at more or less frequent intervals thereafter.

8. The department is required to examine and to license pilots and mechanics working on registered planes, in more or less the same way that it now examines and licenses the masters, mates, and engineers of vessels in the merchant marine.

9. It is required also to establish and enforce air-traffic rules—rules by which all aircraft will be governed in flying on their courses, in taking off, and in landing. It must provide for the identification of all aircraft by number or other symbol.

10. In cutting down the funds for the department's regulatory work (for the two fiscal years, 1927 and 1928) from $630,250 to $421,390—a cut of $208,860, or about one-third—the House has crippled the inspection and licensing features of the air commerce act in a very substantial way. The Budget estimates contemplated that the department would employ a force of 40 inspectors to carry on the actual work of inspecting and registering aircraft, examining and licensing pilots and mechanics, inspecting and rating air-navigation facilities, enforcing the air-traffic rules, and performing the other regulatory work which the air commerce act requires. To facilitate this work, the Budget estimates included funds for the purchase and the operation and maintenance of 10 airplanes, which the department's inspectors would use in the field. The House reduced the number of inspectors from 40 to 20 and the number of planes from 10 to 5. In other words, it cut the effective field force to be used in regulatory work squarely in two. Obviously, this means that but about half of the regulatory work contemplated by the Budget could be done.

11. Now, the Budget figure itself represented a very close estimate of the funds necessary to carry out the regulatory work required by the air commerce act. The Budget figure, of course, was determined last November. It is now the opinion of the Department of Commerce that even the full amount of the Budget estimate would not be adequate for all the work

which should be done if the Government is to give to the aeronautical industry the service which it expects under the regulatory features of the air commerce act. The industry, through its various publications and by correspondence with the department, is every day making it perfectly plain that it is relying upon the Government to carry out the full regulatory program which the act contemplates. It would not be fair to the industry to cut this program in half and allow some important and necessary features to stand in abeyance.

Air Navigation Facilities

12. The appropriation "Air navigation facilities" is available for all expenses of providing beacon lights, emergency landing fields, radio-communication facilities, and other aids to air navigation along air routes, and for maintaining those aids and keeping them in operation. This entire appropriation is transferred to the Lighthouse Service for expenditure.

13. The Budget estimate included $3,219,500 for the establishment and maintenance of aids to navigation along air routes during the fiscal year 1928. The House reduced this amount to $3,011,775—a cut of $207,725. A reduction was made in the number of field employees and in the allowance for fuel and for travel expenses.

14. The department's lighting program up to the end of the fiscal year 1928, was based upon the anticipated contracts of the Post Office Department for carrying the mail. The department's policy was to be in a position to maintain beacon lights, landing fields, and other facilities along such routes as the Post Office Department might put under air-mail contract. It is anticipated by the Post Office Department that the total mileage of air mail routes which will be under contract by June 30, 1928, assuming that proper navigational facilities can be provided, will be 10,408. Of this mileage, 551 miles will be on routes where night flying is unnecessary. Of the remaining mileage—9,857 miles—the transcontinental route has been lighted by the Post Office Department from New York to Salt Lake City, a distance of 2,041 miles. This leaves a mileage to be lighted by the Department of Commerce of 7,816 miles.

The 1927 Program

15. The department has already established lighting facilities and landing fields along certain routes. It is steadily extending the lighted mileage. According to present plans, facilities will have been completed by the department, or contracted for, along 2,496 miles of airway by June 30 of this year. This will leave 5,320 miles to be provided with lights and landing facilities—so far as possible with the available funds—during the fiscal year 1928.

The 1928 Program

16. The department had not expected, even with the full amount of the Budget allowance, to complete the equipment of this mileage during the fiscal year 1928—that is, the 5,320 miles in the Post Office Department program of air-mail routes which will remain without facilities at the close of the current year. With the money allowed by the Budget it was estimated that lighting facilities and landing fields could be established along about 3,500 miles only, which would leave about 1,800 miles of air-mail routes without facilities at the close of the fiscal year 1928.

17. In cutting the Budget figure by more than $200,000., then, the House has reduced an amount which was already inadequate. If the reduction were permitted to stand, it would mean a reduction of 600 miles in the lighting program for the fiscal year 1928. It would cut the mileage to be provided with lights and landing facilities from 3,500 miles to 2,900 miles and leave approximately 2,400 miles of airmail routes without navigational facilities at the close of the fiscal year 1928.

A.S.M.E. Holds Aeronautic Meeting

The meeting of the Metropolitan Section of the American Society of Mechanical Engineers, held on Friday, Feb. 11, in the auditorium of the Engineering Building, New York City, was addressed by H. J. Scharnagel, chief engineer in charge of oil engine development of the Sperry Developmnt Co., a subsidiary of the Sperry Gyroscope Corp., of Brooklyn, N. Y., and Ralph H. Upson, chief engineer of the Aircraft Development Corp., Detroit, Mich. Mr. Scharnagel read a paper, prepared by Elmer A. Sperry on "The Light Supercharged Diesel Engine for Air Service." Mr. Sperry is at present in Europe and was, therefore, unable to be present at the meeting.

Mr. Upson presented some extremely interesting slides and moving pictures relating to airship mooring, etc., and discussed the subject of "Airship Terminals".

W. Laurence LePage, editor of AVIATION, was in the chair at the meeting.

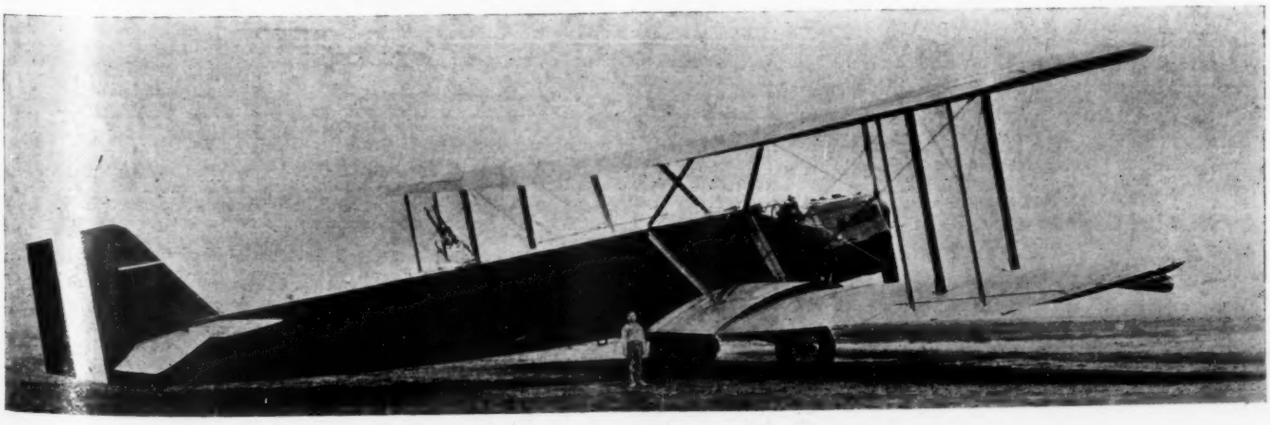
M.I.T. Students Visit Vought Factory

During the week of Jan. 31, a number of the graduates and students of the Aeronautical Engineering Department at the Massachusetts Institute of Technology, Boston, Mass., were given an opportunity to study aircraft design and production at first hand in the plant of the Chance Vought Corp., Long Island City, N. Y.

The party, some fourteen in number, were accompanied by Prof. William Brown and Mac V. Short.

Charles J. McCarthy, engineering executive of the Vought organization, and a graduate of M.I.T., showed the party through the various departments of the plant, explaining in detail the manufacturing methods employed and the many operations required to produce modern military airplanes. The Engineering and Experimental Departments were also visited, where several aircraft of new design were being developed.

The new Corsair Naval observation planes attracted unusual interest, due to the reputation which this new model had made through its extraordinary performances and the evidences of clever design disclosed in the details and arrangement of these planes.



The Huff Daland Cyclops (800 hp. Packard 2A-2500), said to be the largest single-engine bomber in the World.

Progress of the Pan-American Flight

The progress of the Pan-American Flight, from Jan. 26 to Feb. 8, is given below:

Jan. 26—San Francisco and Detroit arrived at Cartegena, 6:30 p.m. St. Louis due Jan. 27.

Jan. 28—Left Cartegena 12:05 p.m. Jan 27 for France Field; arrived there at 4:25 p.m. Bogota flight successful, reception cordial. Planes left for Buena-Ventura Jan. 29.

Jan. 29—Planes left France Field 9:50 a.m. Three planes arrived at Buena Ventura 3:30 p.m. Nos. 4 and 5, turned back fifty miles this side of Panama City, probably due to engine trouble.

Feb. 1—Four planes left Tumaco 10.20 a.m., and arrived at Guayaquil 4:00 p.m. Feb. 1. San Antonio left at Tumaco on account of thrust bearing trouble. Will require new engine. Making effort to secure it at France Field.

Feb. 2—San Antonio burned out engine. Commanding General, France Field, requested to send new engine immediately. Other four planes proceeded Guayquil Feb. 2.

Feb. 2. Three planes reached Paipa, Peru, at 4:10 p.m. Detroit forced landing. Machine came in hour later having had carburetor trouble and signalling others to proceed.

Feb. 3—Arrived at Lima 6 p.m. Feb. 3 (All four gassed at Chimbote). San Francisco, New York, Detroit and San Francisco at Lima but San Antonio at Tumaco.

Feb. 6—Left Lima for Pisco. A damaged tire on the New York delayed flight until too late.

Feb. 7—From Pisco the planes flew to Ilo, near the Peruvian-Chilean frontier. In order to make up for lost time, the fliers omitted Mollendo from their schedule. Began La Paz trip.

Feb. 8—This part of the flight will require about six days. From Mollendo, Peru, Major Dargue wired the War Department that the flight would proceed to Santiago, Chile, via Mejillones and Coquimbo.

Two Air Mail Records

Two new records by pilots in the Air Mail Service have just been announced. Pilot Henry J. Brown left Maywood at 2:49 a.m., Jan. 30 and arrived in Cleveland at 4:41 a.m., making the trip in 1 hr., 52 min., or 327 mi. at the rate of 175.2 m.p.h.

Pilot George I. Myers flew from Bryan, to Cleveland, Ohio, a distance of 142 mi., in 48 min., or at the rate of 177½ m.p.h.

Dornier Wal Planes Make Record Flight

The three Spanish Dornier Wal seaplanes, which left Melilla, on the African Coast, Dec. 10, reached Isabel, Spanish Guinea, Dec. 25, having flown a distance of 7,090 kil. without mishap. The daily flight distances ranged from 500 to 900 km., the average hops being 800 km. a day. The longest stop during the trip was a six day delay at Palmas, made necessary because of unfavorable weather.

It is especially noteworthy that all three planes made the journey without mechanical trouble whatever and that each flying stretch was covered as scheduled, except for the delay mentioned.

The route for each day's flight was as follows:

Melilla-Casablanca	600 km.
Casablanca-Las Palmas	900 km.
Las Palmas-Port Etienne	900 km.
Port Etienne-Dakar	760 km.
Dakar-Konakry	760 km.
Konakry-Monrovia	530 km.
Monrovia-Gran Bassam	890 km.
Gran Bassam-Lagos	880 km.
Lagos-Santa Isabel	780 km.
Total	7090 km.

The personnel on each plane consisted of two pilots, one observer and one mechanic. The planes were the Cataluna, the Valencia and the Andalucia. The Valencia, which is the oldest of the three, is still in good condition, despite its five year steady service.

Exam. for Assistant Mechanical Engineer

The United States Civil Service Commission announces an open competitive examination for assistant mechanical engineer (internal combustion engines). Applications must be on file at Washington, D. C., not later than March 8.

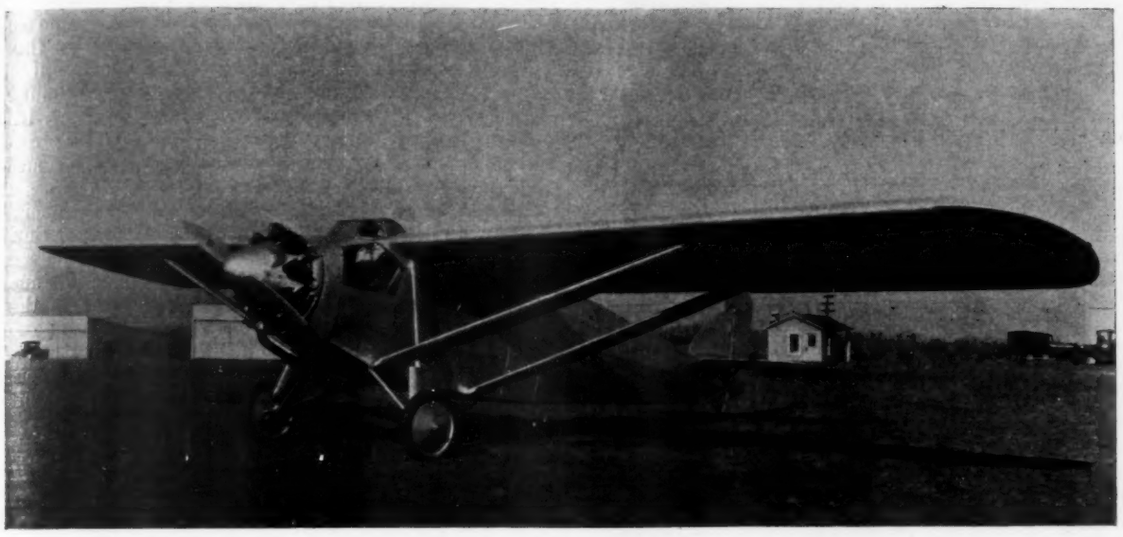
The examination is to fill a vacancy in the naval aircraft factory, Navy Yard, Philadelphia, Pa., at $2,400 a year, and vacancies occurring in positions requiring similar qualifications, at approximately the same rate of pay. A probationary period of six months is required. Advancement after that depends upon individual efficiency, increased usefulness, and the occurrence of vacancies in higher positions.

The duties involve the testing of gasoline engines and engine accessories in an engine laboratory.

Competitors will not be required to report for examination at any place, but will be rated on their education, training, and experience.

P & A Photo

The five Loening Amphibians of the Air Corps Pan-American flight on their arrival at Padre Island, off Point Isabel, Tex. Major Dargue and Lieutenant Whitehead are walking away from the camera.



The Travel Air cabin monoplane (Wright Whirlwind)

The New Travel Air Cabin Plane

Wichita Aircraft Company Produces Cabin Monoplane for N.A.T. for Use on Mail Routes

WHEN THE National Air Transport Co., of Chicago, Ill. asked for bids and a demonstration on a monoplane capable of carrying a 1,000 lb. load, with cargo space of 100 cu. ft. or more and a cruising radius of 105 to 110 m.p.h., and powered with a Wright J-4 Whirlwind engine, the Travel Air Mfg. Co., of Wichita, Kan. decided to design and build such a plane. It was stipulated that test flights were to be made sixty-two days after the receipt of request and work was rushed on the blue prints and other details, enabling the company to finish the monoplane, successfully flight test it at the field and deliver it to the chief pilot of the National Air Transport thirty-eight days after the work started.

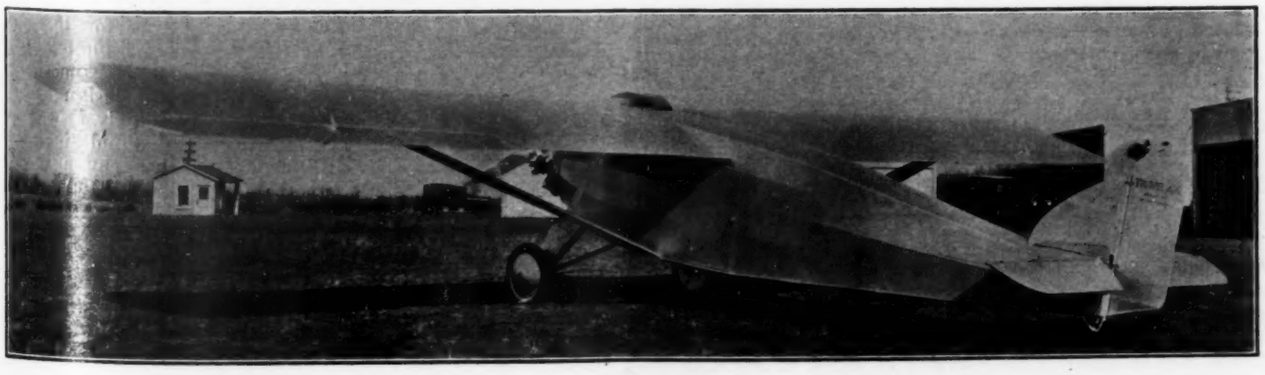
Comparative tests proved to the prospective purchaser the superiority of this monoplane over others and, as a result, the Travel Air Mfg. Co. received a contract totaling six figures. Production on this contract is now under way.

At a time when the fog was so bad as to prevent the N.A.T. planes from making their usual schedule flights, because of the limited vision, this new monoplane was flown from the Travel Air Mfg. Co's. field, at Wichita, to Kansas City, for testing. The extreme stability and ease of control of the machine is one of its features. In sustained flight the pilot need not remain at his seat. The visibility from the pilot's seat is excellent, a quality of the greatest importance at times when it is necessary to fly blind through fog and darkness.

The Travel Air monoplane is an example of the growing tendency to get away from the open cockpit type. The cabin is enclosed and heated, and the cockpit, while being enclosed, is arranged such that the pilot has excellent vision both above and below the wing. A glance at the accompanying picture will show how excellently the plane is streamlined. The engine cowling, while providing sufficiently for the cooling of the radial cylinders, conforms to the excellent lines of the body, and the Standard Steel Propeller Co's. duralumin prop., which is fitted, is equipped with a metal spinner completing the streamline effect.

The first test of the plane was made with a total load of 978 lb., consisting of a pilot and four passengers, in addition to 60 gal. of gasoline. The take-off was made in 12 sec. and the plane, climbing 800 ft. per min., attained a high speed of 125 m.p.h., and a cruising speed, at 1600 r.p.m., of 104.9 m.p.h. The second test took place with a 10 mile wind. The total load was 1,250 lb., and 60 gal. of gasoline. This time the take-off was made in 13 sec. against the breeze, with climb and speed the same as in the first test.

The plane is equipped with an Eclipse self-starter, eliminating the necessity of a mechanic or helper. The body construction and load factors conform with the American Aeronautic Safety Code.



Another view of the Travel Air monoplane. The machine carries four passengers in addition to the pilot.

Dr. Charles Doolittle Walcott

Dr. Charles Doolittle Walcott, secretary and executive head of the Smithsonian Institute, and well known in the aviation field, died Feb. 9 at his home in Washington, D. C.

Dr. Walcott was born at New York Mills, N. Y., on March 31, 1850, and received his early education in the Utica, N. Y. public schools. In 1897, he received an LL.D. degree from Hamilton and during his life was similarily honored by the

Charles D. Walcott

University of Chicago, John Hopkins University, University of Pennsylvania, Yale University and St. Andrews College. In 1909, he received the D. Sc. degree from the University of Cambridge, England, and in 1913 from Harvard College.

In 1876, Dr. Walcott was appointed to the New York State Survey on Geological research and, in 1879, became director of the U. S. Geological Survey. From 1894 to 1907, he was head of the National Museum and, from 1907 until his death, was with the Smithsonian Institute.

Dr. Walcott was the first person to bring to the attention of the Government the experiments of the late Dr. Langley and was one of the founders of the National Advisory Committee on Aeronautics, of which he was chairman at the time of his death.

Determining Temperature Effect on Oil

A new method for quickly estimating the change in viscosity of lubricating oil, with change in temperature, has been worked out by the Bureau of Standards, Department of Commerce.

Engineers often wish to know the viscosity of a petroleum lubricating oil at one temperature when it is known at another. Any oil will thin out with an increase in temperature, that is, it will grow less viscous, but it is difficult to make an exact estimation of the decrease in viscosity. However, by using a distorted scale, the Bureau of Standards has constructed a diagram upon which the change in viscosity with the temperature is indicated by a straight line. If several oils are derived from the same crude, the lines on the diagram showing the change in viscosity of these oils, with a change in temperature, will be approximately parallel.

Another sample of crude oil might yield lubricating oils, which would be represented on the diagram by lines having a different slope. In general, the slopes of the lines are least for Eastern oils, most for Western, and intermediate for mid-continent oils. The diagrams which have been constructed are provided with scales of slopes to aid in estimating the slopes of the viscosity-temperature lines, so that a more accurate estimate may be made of the viscosity of an oil at any desired temperature.

South Atlantic Mail Speeded by Air

It is reported that negotiations have been completed between the various nations concerned, which will enable mail from France to be transported to the Argentine by the quickest possible methods. Under this agreement, mail will be carried from Toulouse, France, to the Cape Verde Islands, off the West Coast of Africa, by airplane and seaplane, this section of the service being operated by the Latécoère company, which now runs air mail service between Toulouse and Dakar.

From the Cape Verde Islands, the mail will cross the South Atlantic to La Fernanda-Norohna by fast steamer, and aircraft will again carry the mail down the coast of South America to Buenos Aires. It is expected that when this service first goes into operation, probably on Sept. 1, the distance will be made in seven and a half days, but that, with the gradual development of the service, this will be reduced to four days. At present it takes considerably longer than this. It is reported unofficially that the aeronautical intrests concerned in this contract will have at their disposal a total of 200 airplanes and 40 seaplanes.

Aero Club of Penn. Elects Officers

The Aero Club of Pennsylvania held its annual meeting at the Engineers Club on the evening of Jan. 26 and the following officers and directors were elected for the ensuing year.

President, R. Sanford Saltus Jr.
1st Vice-Pres., Hollinshead N. Taylor
2nd Vice-Pres., C. T. Ludington
Treasurer, William Sheahan
Secretary, Roy G. Miller
Directors.

Harold F Pitcairn	W. Wallace Kellett
Thomas E. Eldridge	Joseph A. Steinmetz
J. V. Dallin	Thornton D. Hooper
Robert P. Hewitt	C. B. Graham

It was announced that a club house had been placed at the disposal of the members on the Philadelphia Municipal Flying Field by the Ludington Philadelphia Flying Service. The Club in accepting this offer, now will enjoy the advantages of quarters on a flying field in active operation.

In laying out its activities for the coming year it was planned to hold an air meet on the Municipal Field in the Spring. This meet will be held under the auspices of the Aero Club and directed by the Ludington Philadelphia Flying Service in cooperation with the National Guard of Pennsylvania which is also located on this field. This will be the official opening of the field. The definite date of this meet will be announced at a later time and it is planned to hold races, exhibitions and other features arranged to stimulate the interest of the general public in aviation as well as affording an opportunity for all those who are actively engaged in aviation to get together.

It was further planned by the Aero Club to start a junior membership whereby boys and young men under eighteen years of age will have an opportunity of expressing their ideas and to stimulate their interest in aeronautical affairs.

A Correction

In the Jan. 31 issue of AVIATION, there appeared a photograph taken on the deck of the U.S.S. California showing a Vought UO-1 seaplane on the catapult. The three 14 in. guns in the after turrent were raised to a very high angle obviously with a view to providing more space for the seaplane operations. The caption on the original photograph, however, stated that these were anti-aircraft guns—some news photographer presumably jumping to this conclusion owing to the high elevation of the guns—and accordingly it was so stated in AVIATION. The error was perfectly stupid since the guns in question are obviously far larger than any anti-aircraft equipment carried to sea. We are informed that the largest anti-aircraft guns in the U. S. Navy are the new 5 in. batteries now being installed on all first line ships.

Pacific Scientific Co. B. G. Representative

The Pacific Scientific Co., of Los Angeles and San Francisco, Cal., were recently appointed representatives on the Pacific Coast of the B. G. Corporation, of New York City, manufacturers of B. G. spark plugs.

The Deruluft Airline to Moscow

(SECOND PART)

Diary of the Night Flying Trip from Berlin to Capital of Soviet Russia

By LESTER D. GARDNER

This is the second of a series of articles by Mr. Gardner describing the principal airlines of Europe, Asia and Africa. Mr. Gardner flew 21000 miles last summer over the foreign air routes and through the courteous cooperation of the various airlines will present for the first time not only the observations of an experienced air traveller, but facts that can be considered authoritative.—ED.

After flying from Cairo to Baghdad and back to Jerusalem and then having flown from Munich to Constantinople, back to Vienna, thence via Prague to Warsaw, the air tourists who are relating their experiences and observations in this series of articles thought that they had exhausted all the emotional pleasures that intensive and scenic flying could provide. But they had not flown at night over any regularly operated air line. That was to come and it was anticipated with great expectations. And then, a trip to Moscow is generally regarded as a visit to an exclusive club or Thibet or some other place where only the elect or venturesome are permitted.

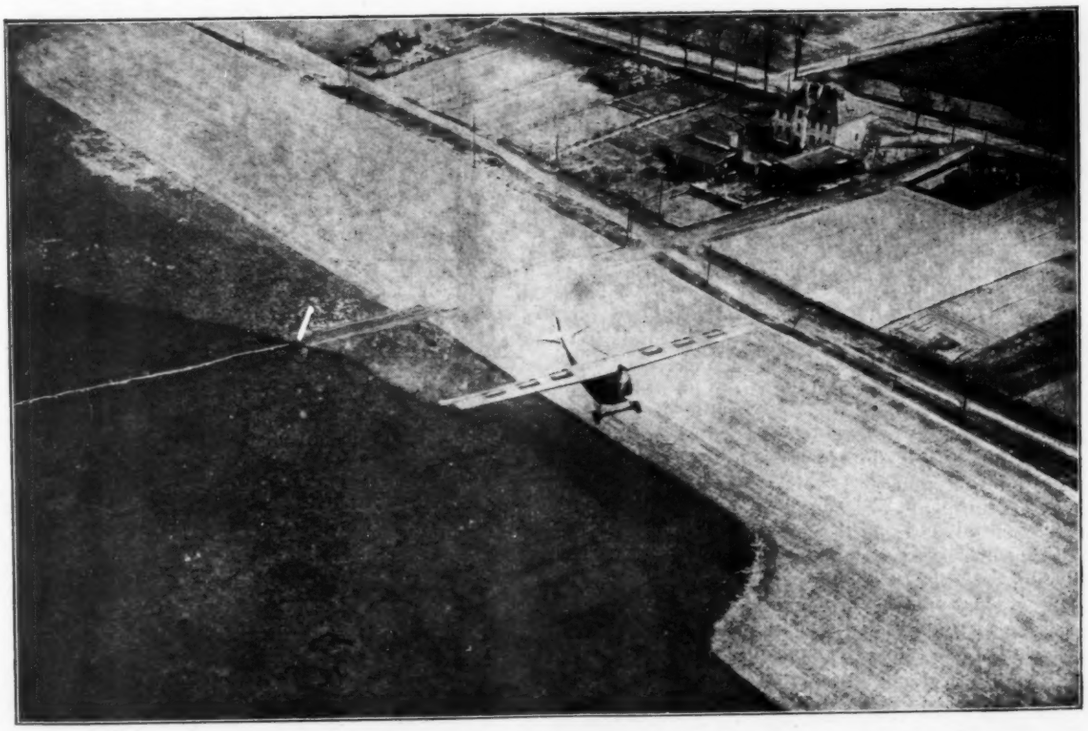
Courtesy of Soviet Officials

Our last stop had been Dresden and the account of the flight to Berlin and other trips will be found in other articles of this series. It was only a short hour's journey by air from the beautiful city on the Elbe to Berlin. There, through the great courtesy of Messrs. Merkel and Fette, heads of the Luft Hansa and Deruluft airline companies, the necessary visas were secured from the Russian Embassy in Berlin. Letters from American friends had provided the needed credentials and all the rumors rearding delays and procrastination that had reached this "air trotter" once more proved how groundless are some of the tales that come from returned travelers to the Soviet Republic who wish to emphasize their experiences. All this applicant for admission was told was that the Soviet government welcomed visitors, but did not wish to have propogandists spread false reports or give lurid accounts of their experiences. All they asked was that a person go to Russia with an open and receptive mind and tell the truth of conditions as they were. With this freedom of mind and absence of any preconceived opinion, the trip was looked forward to with the keenest anticipation. Mrs. Gardner, who had flown over 4,000 miles decided to remain in Berlin although she to had received a most cordial invitation to visit Moscow.

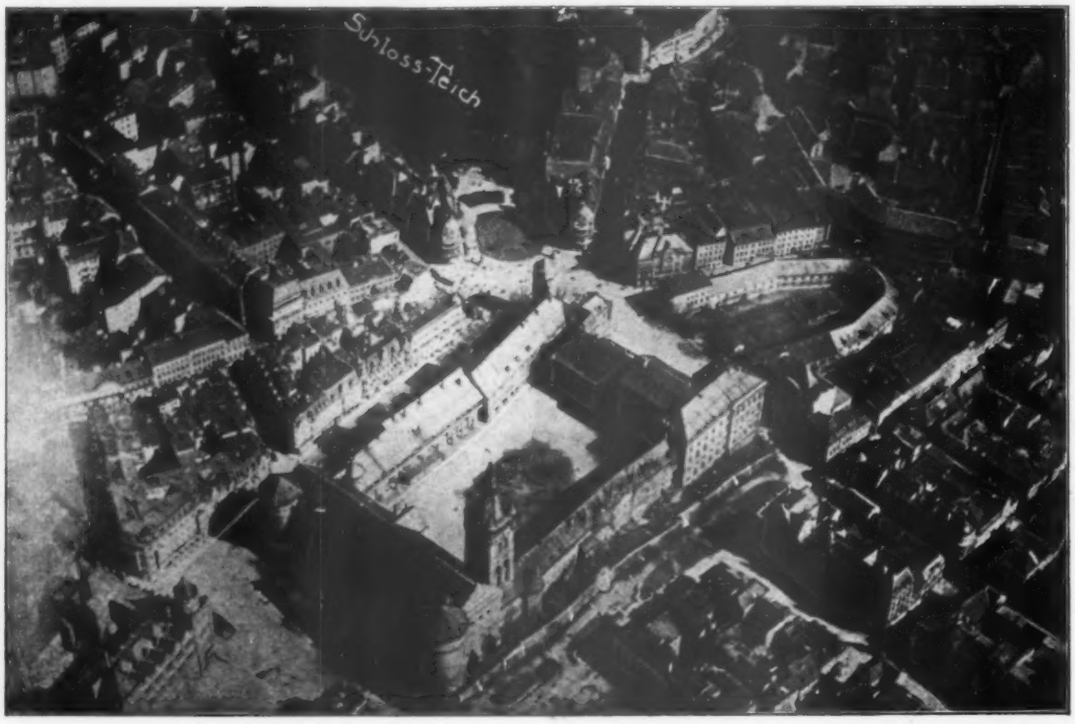
Beginning of Night Flight

We visited one of the theatres while the night flying three-engined Junker planes that fly to Moscow were being made ready to leave Berlin at two o'clock in the morning. After the performance, and a midnight supper, it was only a short taxi ride to Tempelhof Field, which is near the center of Berlin. Formerly one of the Kaiser's principal drill grounds, it is now transformed into a great airport. Here the air tourist receives an exhibition of that efficiency that has brought fame to the Teuton.

The immaculately clean rest room is flooded with light and the cheerful furnishings lure the traveller to rest until his interest is aroused by a slow moving gray shadow rolling across the field. The twelve passenger metal plane that is to fly through the darkness to Danzig has been brought out of its hangar and if its species were not known, it could be easily mistaken for one of the enormous antediluvian creatures that once crept over the earth. But suddenly the whole field is flooded with a brilliant illumination. The hangars, too, burst into light from the gloomy murk of the night. A



Off to Moscow.



Left: Air vi... Teutonic ... this castl... famous wi...

Right: View ... large city ...

Below: The ... and most ... stone office ...

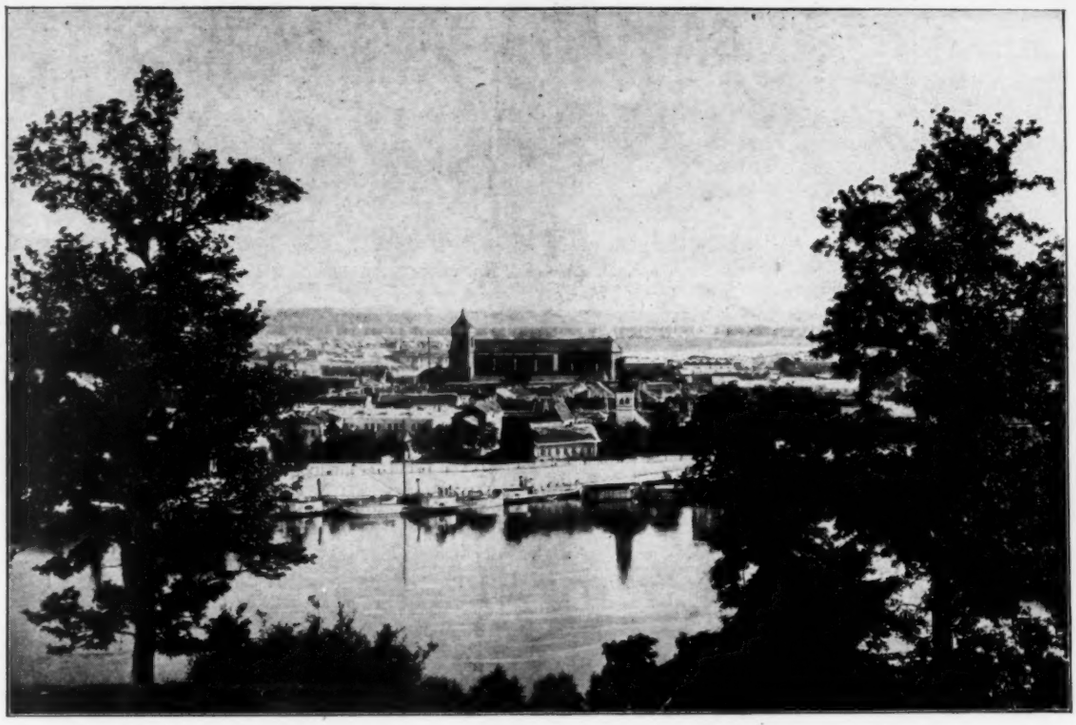
squad of mechanics serves the engines and the two pilots take their places. The passengers are ushered to their seats and the doors closed. The purring engines snort blue flame and the plane commences rolling across the field. When flying speed is reached the plane takes off so smoothly that the passengers do not know whether they are on or off the ground until the glow of the field below can be seen and the street lights of Berlin twinkle for miles in every direction. The Capital has the appearance of the heavens on a starry night.

Twilight Flying

Our cabin with its soft upholstered seats has been darkened and some of those who have taken the trip before and are now veterans, prepare to sleep until the sun appears. Those who are making their first night flight peer into the darkness and try to distinguish some familiar landmark, but only an occasional blinking light now rewards their search. After an hour of this we are rewarded by a slight tinge of gray on the distant horizon. It is only three o'clock, but in these northern latitudes daybreak comes early. The twilight is short at 3,000 feet in the air, and daylight comes to the air passengers while the ground below is still dark. Soon the creeping shadows disappear in the west and the night flight is over. Another chapter of flying experience is closed and we turn to our maps to learn how far we have flown from Berlin. We find that we are now over the famous Polish Corridor that gives the new republic an outlet to the North Sea. The free city of Danzig is coming into view and before we realize it the big craft is gliding across the airdrome. Breakfast awaits us. It is welcome.

Off again, it is only an hour's flight to the quaint old East Prussian city of Konigsberg. Here we find one of the model airports of Europe. The administration building with cheerful restaurant and waiting rooms give a visible indication of the permanent character of the German aerial enterprises.

It might appear strange to find in this far corner of Europe aerial development at its most advanced stage. But Konigsberg has always been a great seaport on the North Sea and for five years has been the northeastern air center of Europe. From here, lines radiate to Moscow; to the west along the coast of the North Sea; southward to Warsaw, as well as the route we have just flown from Berlin. Here a

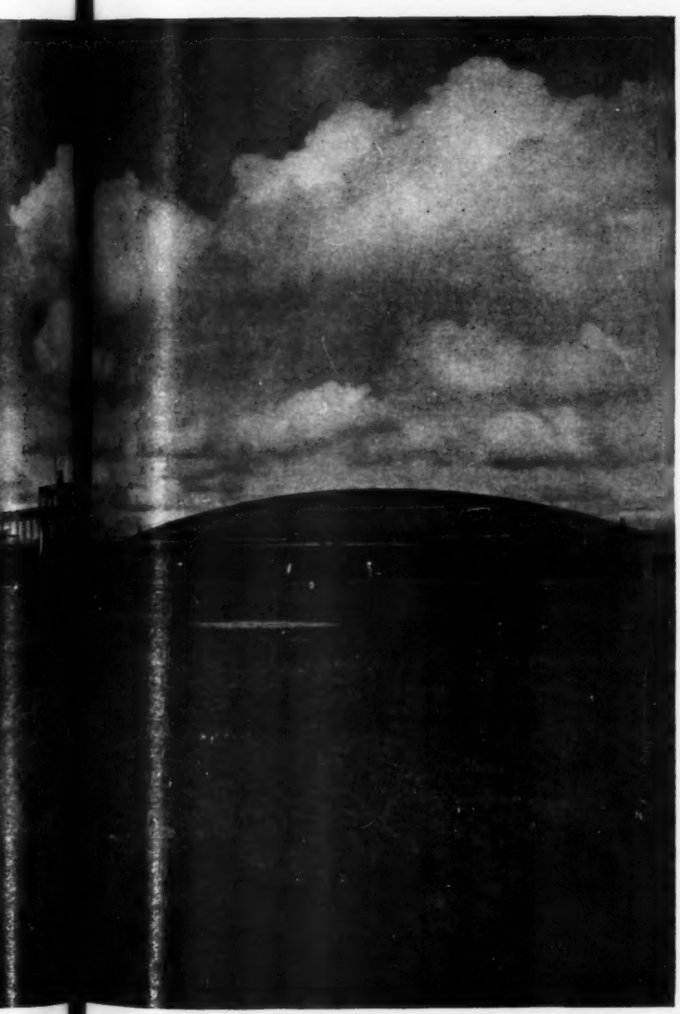


SCOW

ncient home of the In the cellar of one of the most

Lithuania, the first g Konigsberg.

ne of the earliest Europe. Note the permanent hangars.



school for the study of air law has been founded, and from the research work done at Albertus University may be evolved the fundamental principles of the laws governing air transport. Then, this newest means of transportation will have its basic charter of operation. The head of the air law course is Dr. Schrieber, a pioneer in the new art which must soon have its laws and regulations comparable to the admiralty laws of the sea.

The Start for Moscow

Our schedule called for us to reach Moscow before evening, and as the Russian plane was standing with whirling propeller, the passengers did not keep the pilot waiting. On entering the five passenger Fokker monoplane, we found the mechanic seated in the cabin, instead of in his customary place alongside the pilot, and were to learn the reason later on.

The pilot Schebanoff is a Russian. It was his last trip before making a non-stop flight from Moscow to Paris, to show Western Europe that the Russian air development is not as backward as may be imagined from the little that is allowed to be printed about it.

The day's flight from Konigsberg to Moscow was not what may be called a scenic flight. As is the case with flying over agricultural countries the monotony of the flat surface with occasional woods, streams and villages to keep the mind occupied is such that the best recourse is to a book concerning the history of the people and cities that are passing beneath. The comfort of a smooth riding aerial passenger carrier where one can read or sleep at will when the scenery becomes dull is greatly appreciated by all air travellers. The noise of the engine is avoided by putting cotton in the ears. With this silencer I fell asleep for perhaps half an hour. Then I jotted down these notes in my diary:

"June 28, 1926—The weather is perfect. The officials put a seal on my camera so that I could not take any pictures from the air. I was also told to give it to the pilot for safe keeping. All my baggage was similarly sealed and put in the compartment for mail and express packages. After taxiing along the ground for about ten minutes to get a long runway in which to take off, for we have a very heavy load of gas aboard, we made a fine start, and as we circle over the edge of the city we get a very clear view of old Konigs-

A group at Smolensk.

berg. My mind goes back to the Blutgericht or blood vault in the cellar of the castle built by the earliest Teutonic knights, formerly the wine vault, but now one of the most picturesque restaurants in the World. Its waiters are dressed as the wine handlers were a hundred years ago. There are a few clouds at 5,000 feet. No other passengers. The country is as flat as Kansas. We left at 7:30 and have been in the air for an hour.

Kovno Reached

"From the map, I think we have crossed the border of Lithuania, just north of Vladyslavov. I have tried to pronounce it and it sounds like an earfull of scrambled consonants. The weather has changed and the farther we go the thicker it becomes. Looks as though we might have a hard time later on. The rain seems to be following us. Ahead, it also looks very heavy and dark.

"At 9:01 we cross the Njemen River that flows from Tilsit to Kovno the capital of Luthuania. The guide book says that it was the center of the trade from Russia to Prussia before the War, and ever since the 11th Century has been an important city. Usually the plane stops to take on gas and leave the mail but today the mechanic just opened the door, as we flew over the airdrome, and threw out the mail sack. The crowd on the field waved to us cheerily. The bridges across the river are still down, having been destroyed during the War. A big Zeppelin hangar is the most conspicuous building that I can see. There has been a heavy rain here as the streets are very wet and the people are still carrying umbrellas.

Flying German Planes Over Poland Prohibited

"As German airplanes cannot fly over Poland, we take a course to the northeast over Latvia, another of the small Baltic countries that was severed from Russia by the war. We are now finding the visibility very bad, and the pilot cannot see to the right or left for more than a quarter of a mile. He follows a perfectly straight road along which we see peasants driving their carts.

"At 9:37 we fly over Vilna which appears to be built entirely of wood. The mechanic has just lifted the apron in the front of the cabin and can make any adjustments that are needed on the Rolls-Royce engine. It is a very good arrangement as sometimes minor changes may correct anything wrong before it becomes serious. Flying in this country is as safe as any I have ever seen. We can make a landing anywhere.

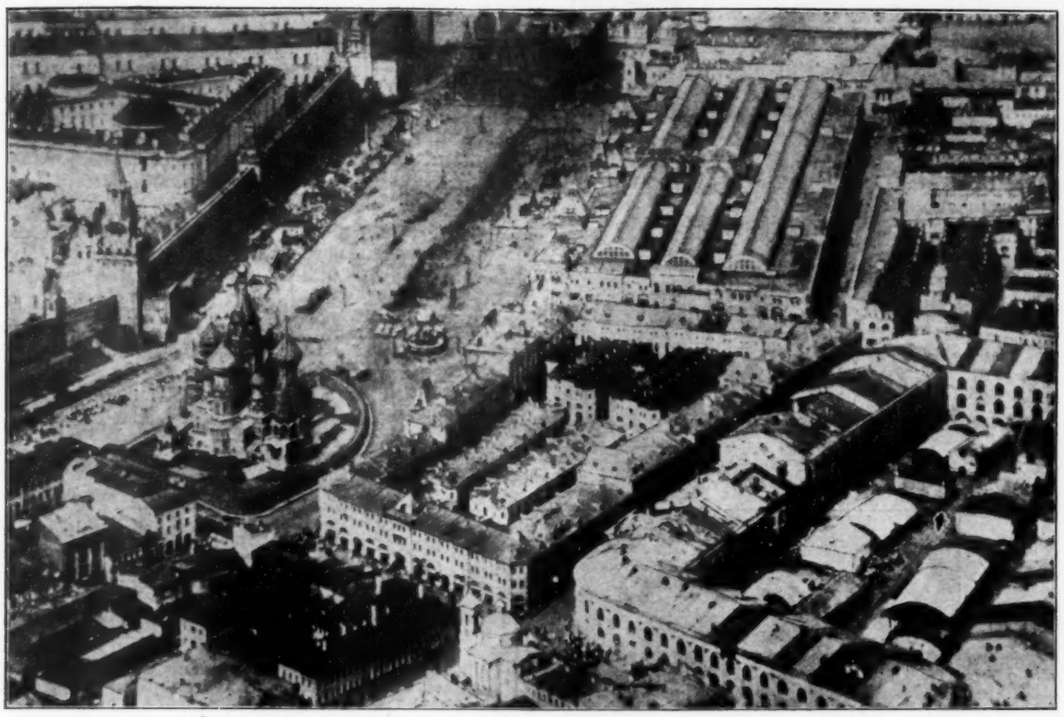
"At 10:27 we pass Uzjany or that is what it looks like on the map I am using. It is surrounded with trenches. There must have been considerable fighting here. We can see many shell holes. We are now being shut in by fog and if it gets worse we may have to run from it or land until the weather clears. We have turned off our course to get visibility. The pilot is following a railroad and from the way he keeps to it, it is evident that he does not want to take chances of getting lost in this flat country with so few landmarks. At 11:05 we seem to be running out of the bad weather. That's fine, for it means that we can get to Moscow tonight.

Russia—at Last

"At 11:10 we reach the first town in Russia, Drissa. The weather is better. The sun is trying to shine. The Soviets have certainly given me a fine reception for my first view of their country. It looks as though we would reach Smolensk, our first landing place in Russia on time—at about one o'clock.

"There has been a great change in the appearance of the surface under us since we reached Russia. The country is much more thickly settled than that behind us. Farm houses with thatched roofs dot the landscape in all directions. They are in clusters. We reach Polotsk at 11:40. The book says that it is inhabited chiefly by Jews and was once a flourishing city, but continuous wars and plagues have reduced its population to about 20,000. It was originally an independent principality with its own ruler, until the Lithuanians took it in the Twelfth Century. Later, Ivan the Terrible captured it, and still later the Poles had it for awhile. For the last hundred and fifty years it has belonged to Russia. It is fortunate that I brought a good gazeteer, as without it I would not know anything about the cities that we are flying over. In case I write anything about flying over strange countries, I shall advise all travellers to carry a good guide book. It a lds greatly to the enjoyment of the trip as well as helping to while the time away.

"I expected to find things all run down when I crossed the Russian border, but one thing has made a great impression on me. We have been following a railroad for miles and I



Lenin Square, Moscow. The Kremlin in upper left corner, Pokrovsky Cathedral with its many colored domes in foreground. The tomb of Lenin is directly in front of the Kremlin in the Square.

have tried to see how it is maintained. The stations seem to be very neatly kept, but the most noticeable innovation is that there is a well trimmed green hedge along either side of the track. If a railroad had a hedge like that in America, passengers would believe the railroad was making so much money that it had to spend its excess earning in that way. It is one of the prettiest stretches of track that I have ever seen and is a credit to the workmen whom I presume are government employees.

"At 12:15 we reach the River Dvina and pass over Vitebsk a large city of 50,000 people. The churches are the most important buildings to be seen and the boats on the river indicate that there is much water traffic here.

Over the Lake District to Smolensk

"We have been flying over a very different kind of landscape for the last hour. Instead of a flat plain, the whole country is dotted by lakes of all sizes. It is a great change, and welcome one, for water always brings woods and green countrysides. We are still following the railroad and heading directly for Smolensk. The book says that it is one of the oldest cities in Russia, and here on his march to Moscow, Napoleon fought a very decisive battle in 1812. I can just see the city dimly in the distance. It is now 1:45. A surprise has come; something that has never happened to me in flying before. The mechanic has drawn the curtains that extend the whole length of the cabin, and I suppose that I will miss seeing the city. Why, I do not know. We are landing.

"It is now 2:15 and we have taken off for the trip to Moscow. The stop at the field at Smolensk was very interesting. The Russian passport official took my evergrowing souvenir of the trip and evidently treated it as a curiosity as it now has twenty-three visas and the stamp of practically every airport of importance in Europe. The ten pages look like the credentials of a refugee from the Tower of Babel after the confusion of tongues. But I was more interested in getting something to eat and wondered how I would fare with a language that I could not understand at all.

"It was all very easy. An attractive Russian girl with a sky blue handkerchief adorning her head had thoughtfully prepared a most appetizing lunch. Tea in large glasses; an omlet that evidently was related to the fine white chickens that were picking up their daily needs around the little shack where the table for visitors was spread; bread and cheese, with delicious tiny Russian strawberries and macaroons to complete the meal made me feel much refreshed. I had no Russian money but, as usual, found that a good old greenback American dollar bill was as welcome there as it is in every other part of Europe. I made signs to indicate that I would return in a day or two and asked that I be given an equally good breakfast.

"I had a welcome smoke and I was surprised that the customs official did not inquire whether I had more cigars as has usually been the case in crossing other frontiers. I looked across the airdrome and could see a half dozen well constructed hangars but no airplanes on the field. They evidently do not want strangers to see what military types of aircraft they are using. But as I looked away from the field I was startled to see several hundred soldiers appear from behind a slight rise in the ground. A friendly smile from them let me know that they were as curious to see me as I was to see them. Their uniforms were very shabby, but it may have been due to their being on maneuvers. I wondered if they were typical of the largest standing army in Europe.

Efficiency at Smolensk Airdrome

"I was particularly interested in the way the plane was serviced at the Russian airport, for it is by these seemingly uninteresting details of flights that an opinion can be formed as to the reliability and efficiency of an air line. Everything was done in a most business-like manner and nothing was overlooked. After I had entered the cabin the curtains were once more drawn and we took off. It is probably the only place in the world that this occurs and the experience of landing and taking off in a darkened cabin was a new sensation. I didn't like it. I prefer to see where I am, in flight.

"The trip to Smolensk from Konigsberg covered 498 miles, and we took five hours and thirty-three minutes to fly this distance. Our speed averaged 96 miles an hour. The distance to Moscow, 242 miles, should be covered by five o'clock."

"The country after leaving Smolensk became more hilly and the farms patchy, appearing to be worked only for home supplies. The weather was uncertain. Off to the north we saw storm clouds and occasional flashes of lightning. At 2:40 we flew over the city of Dorogubush which was interesting, with a very large manufacturing plant of some kind and much new building in progress. From the air, this first Russian industrial city that I have seen does not give any indication of decay, but quite the contrary appearance. I wonder if all the impressions that I have been given about the disagreeable conditions in Russia will be as quickly changed.

"To the north we can make out the spires of Vjasma but we are too far away to see it clearly. I notice that the book "Russia Today," given me in Berlin, was published in New York. It says that the outward appearance of Moscow and other principal towns is almost the same as it was before the war, except for an improvement in cleanliness. It is hard to realize that this morning I was in Berlin and in another hour I will be alighting at the capital of the Soviet Republic. Next year, I may only think of Moscow as a way station on the way to Pekin. If Aladdin had given me his magic lamp, it could have provided no greater wonders than the Deruluft company's plane has offered today. It has truly been a ride on a magic carpet.

"The cemeteries are a very different kind than any I have seen. They appear to be just mounds of earth alongside the roads with no markers or other means of identification. Probably it is a continuation of the ancient custom of burial alongside the roadways such as may be seen at Pompeii. The farms have a gridiron form with long rows of cultivated spaces. I think we are approaching Moscow. There are more villages and they have churches with vividly colored roofs. Blue seems to be the favorite color. It is 4:15 and I can make out the dim outline of a large city that must be Moscow. I must look for the Kremlin, first, for a sight of that from the air would be alone worth the whole trip. As we get nearer, church domes and spires, gilded and of many colors may be distinguished. The Kremlin with its walls appear as we are flying over the northern part of the city. I can now see the flying field and we will land in a few minutes. Land 5:10.

(Next week—"A Day in Moscow" and the return trip to Berlin)

The Chodynka, terminus of the Deruluft airline at Moscow. Other Russian airlines use this airport and it is also used as a military airdrome.

Aircraft Exports for November

The Bureau of Foreign and Domestic Commerce, of the Department of Commerce, Washington, D. C., reports domestic exports of aircraft and engines, from the United States, for the month of November, as follows:

	Engines for aircraft		*Airplanes, seaplanes and other aircraft*		*Parts, except tires*
Countries	*Number*	*Dollars*	*Number*	*Dollars*	*Dollars*
United Kingdom	–	—	–	—	390
Canada	–	—	–	—	1,098
Honduras	–	—	–	—	65
Mexico	1	487	–	—	743
Cuba	–	—	–	—	580
Argentina	–	—	1	5,083	267
Brazil	–	—	–	—	1,660
Colombia	–	—	–	—	115
Venezuela	–	—	–	—	145
Japan	1	600	–	—	—
Total	2	1,087	1	5,083	5,063

Great Hangar at Karachi

The construction of what will probably be the largest airship hangar in the World, is now under way at Karachi, India. The first piece of structural work was hoisted onto it. concrete bed early in October. This hangar is for use in connection with the proposed Imperial airship service from England to the East and on to Australia.

Old Issues of Air Mail Stamps Recalled

The Post Office Department withdrew the 8, 16 and 24 cent air mail stamps, on Jan. 31, which up to that time had been in use between New York and San Francisco and intermediate points. This was coincident with the enactment of the new rate of 10 cents per half ounce, or fraction thereof, without regard to distance, which became effective Feb. 1 on air mail matter.

Goodyear Sketches History of Airship

The Story of the Airship is the name of a booklet, issued by the Goodyear Tire and Rubber Company, of Akron, Ohio, dealing in a brief way with the evolution of the airship from the balloon designs of the Montgolfer brothers in 1783 to the present time. The booklet is divided into several sections, dealing with the beginnings of flight, the airplane and the airship, balloons, non-rigid airships, semi-rigid airships, the rigid ship, America's facilities to build ships, military uses of the airship, etc., etc. The booklet is fully illustrated.

Klamath Secures Waterhouse Agency

The Klamath Air Service Company, of Klamath Falls, Ore., has secured the sole distributorship for all products of the Waterhouse Aircraft, Inc., of Glendale, Cal.

Side Slips

By ROBERT R. OSBORN

In describing the proposed visit to the Americas by Commander de Pinedo, of the Italian Air Force, the newspapers state: "His itinerary is not fixed and he may enter the United States either at Charleston, from Cuba, or at New Orleans, from Mexico. In the latter case he may visit San Francisco, Seattle and Chicago. From New York he will go to Boston, Nova Scotia and Newfoundland, returning to Europe by way of the Azores." Looks as if the Commander has made a perfect alibi to cover any navigation errors he might make while visiting us. With an itinerary as elastic as this one, he could land almost anywhere on the continent and be able to prove that he wasn't lost—that he had intended visiting Hicksville all of the time. The reports sent back to the Italian newspapers will probably be somewhat like our "Somewhere in France" war news items, "This evening Commander de Pinedo landed somewhere in the United States, reported to be in the Mississippi valley. Tomorrow, if weather conditions are favorable somewhere else in the United States, he may leave for somewhere else, but he wishes it to be understood that his plans may be changed at any time."

Foreign visitors have the failing of underestimating the size of this country, and generally plan to cover most of it in a very short time. An Englishman came into a friend's office in Philadelphia, trying to locate a position, several years ago. He said he couldn't find work in England, so had come over to America to look for it. Not having had any luck in Philadelphia, he thought he "might pop over to Los Angeles to have a look." When our friend had convinced him that the cost of popping over to Los Angeles was comparable to that of popping back to England, he agreed to have a look around Camden, N. J., Wilmington, Del. and a few nearer towns.

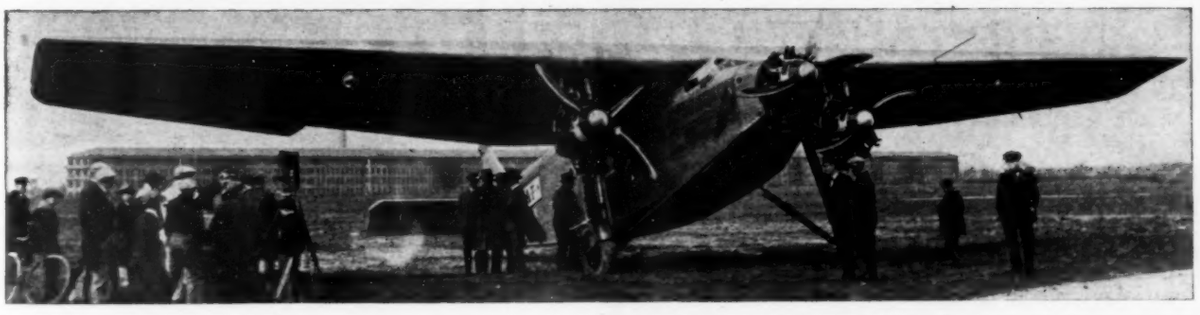
• • • •

A recent issue of AVIATION states that two prominent fliers "hopped off from the Philadelphia Municipal Field and in fifty-seven minutes were chatting with Sumner Ireland on Curtiss Field, Garden City, Long Island." This appears to be a very interesting record for other fliers to shoot at, and we suggest that some wealthy philanthropist provide a "Chatting with Sumner Ireland Trophy" to be in competition each year at the National Air Races. Mr. Ireland is ideal for this purpose as he is very interesting to chat with, speaks several languages, and is agile enough to dodge anyone who might want to chat, head on, at about a hundred and thirty miles per hour. We haven't consulted him yet on this proposition, but we are sure that, for the good of the industry (Ireland Aircraft, Inc.) he'd be willing to serve as the finishing pylon.

• • • •

Friends of the Liberal forces in the Nicaragua imbroglio, are protesting that some American fliers, civilians, have been hired to bomb the Liberal troops. The solution to this difficulty is really so simple that we wonder it was never thought of before. All that need be done is to pass a group of air laws similar to ours, and start the license numbers at ten thousand. The planes in question would then be so overburdened with figures and letters that they wouldn't be able to leave the ground. Even if they did manage to stagger off with a couple of bombs they would not be able to drop them, as Rule "K" in Chapter Five specifies that "Nothing which may endanger life or property shall be dropped from any aircraft, except when reasonably necessary to protect life."

If this idea will solve the problem for the Nicaraguan Liberals, they may use it after payment of our usual fee.



THE FORD ALL-METAL TRANSPORT MONOPLANE

Powered with three 200 h.p. Wright Whirlwind Engines

Equipped with

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Aircraft Magnetos

SCINTILLA MAGNETO COMPANY, INC.

Contractors to the U. S. Army and Navy. SIDNEY, NEW YORK

AIRPORTS AND AIRWAYS

Wichita, Kans.

By Rufus E. Deering

Alonzo Cape, general manager of the Alaska Airways, Inc., of Anchorage, Alaska, was in Wichita recently, completing a deal with the Travel Air Company for three planes to be put in service in Alaska. The planes will leave here Feb. 15 for Anchorage, where three months full capacity booking awaits them. Jack Laass, special representative for the Travel Air, will accompany the planes to Alaska and place them in commission.

The planes are to replace dog teams in the mail service and be used for general freight, passenger and express service. They will be equipped with radio and carry pontoons, wheels and skiis for landing on snow and ice.

These planes are expected to replace a weeks travel with a dog team with an hour or two of service in the air. They will be used for running miners to the goldmines in the interior and for spotting schools of salmon during the salmon run, in addition to the freight and express service. The planes are expected to increase the efficiency of the salmon fishing boats a hundred per cent by spotting the salmon before they enter the rivers.

The Alaska Airways was organized by business men of Alaska for the purpose of bettering transportation facilities in the North. The company has already promised to co-operate with and support Lieutenant Commander Byrd in his survey and mapping of polar regions which is to be undertaken soon. This is the first order of planes to go to the Alaska Airways. As soon as the three planes are in commission the company expects to duplicate the order.

Jack Laass, special representative of the Travel Air Manufacturing Company, recently delivered a Type J 4 Whirlwind, special model, to H. C. Lippiatt in Hollywood, Cal., making the 1,700 mile trip from Wichita to Hollywood in eighteen hours.

The Travel Air Manufacturing Company has completed plans and soon will build a factory four times as big as the present one. The factory will be built at the Wichita Flying Field. It will be 75 by 175 ft. in size. Contracts for planes have piled up so fast lately that it is necessary to make this increase in facilities to care for the demands for Travel Air machines. Recently a contract for planes valued at $127,000 was signed by officials of the National Air Transport. The new factory will have a capacity of a plane a day.

Clyde Cessna, pioneer airplane builder of Kansas, and designer and builder of the Travel Air planes, has sold his stock in the Travel Air Manufacturing Company and will shortly start designing a new model monoplane which he expects to develop and place on the market. He sold his interest in the Travel Air to Richard M. Gray, John Rigby and J. A. Wood at $90 a share.

Mr. Cessna built and operated the first airplane made in Kansas, sixteen year ago. It was a monoplane and he has always had faith in that type of airplane. It was Mr. Cessna

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who designed the Travel Air plane which won the Ford Reliability tour last fall and the commercial planes which the company is building.

Mr. Cessna is the oldest pilot in Kansas having made his first solo flight sixteen years ago.

Cincinnati, Ohio

By R. Alvin Hug

T. Higbee Embry, president of the Embry-Riddle Company, Waco distributors, was married on Feb. 1, to Miss Ruth Alice Miller of Dayton, Ohio. Another good flier gone wrong! The wedding took place at the home of the bride and among those in attendance were John Paul Riddle, Embry's partner in business, and his wife. Mr. Embry and his bride departed immediately after the ceremony for Asheville, N. C., where the couple are spending their honeymoon.

Despite the severe cold and changeable weather, Cincinnati has experienced throughout the Winter, fliers at Lunken Airport have been up in the air practically every day. This is a record to be proud of, as no other airport in this district has operated continuously throughout the Winter. Several important cross-country trips have been made by the Embry-Riddle Company within the past few weeks. Flights were made to Columbus and Indianapolis carrying the first finished products of the new radio set just perfected by the Crosley Radio Corporation. These sets were completed at the Crosley factory in the morning and delivered to the two cities mentioned by noon, an example of quick airplane delivery! John Paul Riddle also made a 125 mile flight to Huntington, W. Va., in 1 hr., 15 min., thereby aiding a salesman to put over a $20,000 deal before his competitor arrived by train.

The Embry-Riddle Company has completed about twenty-five hours of photographic work since the first of the year. Present plans are to make a mosaic map of Lunken Airport and vicinity to aid city officials in outlining plans for expansion and improvement of the present field. Col. Sherrill, city manager, states that the city will put forth its best efforts to make Lunken Airport one of the largest and best flying fields in the United States.

The Embry-Riddle Company has soloed three students since Jan. 1 and four are taking instructions at the present time. T. Higbee Embry has ordered a special Waco 10 to be equipped with a Hisso motor and which will be ready about the middle of March. You will be able to see this plane when Higbee has it up in the sky, for it is scheduled for a coat of vivid red!

Major Edward Hoffman, commander of the reserve officers stationed at Lunken Airport, has been awarded the Collier Trophy for 1926 for his painstaking efforts in developing the present day parachute. This is certainly one of the greatest honors that has ever been conferred upon an aviator of the Middle West and we all unite in congratulating Major Hoffman.

All pilots are cordially invited to visit Lunken Airport when passing over or near the city. The field is located in the eastern part of the city between the Ohio River and Little Miami River and adjacent to the C., G. and P. traction line. The hangar is equipped with a wind cone and the field is large enough to permit landing in any direction. Gasoline, oil and parts are available on the field and pilots are sure to enjoy their stop at Lunken Airport.

UNITED STATES AIR FORCES

The First Pursuit Group Winter Maneuvers

By Walter Brennan

Winter maneuvers at Ottawa and Montreal, Canada, gave the First Pursuit Group, stationed at Selfridge Field, the most severe trials under Winter flying conditions, that it has yet experienced. The 1,100 mile trip across the border this year was substituted for the usual two weeks stay at Camp Skell near Oscoda, Mich. The trip was made at the usual

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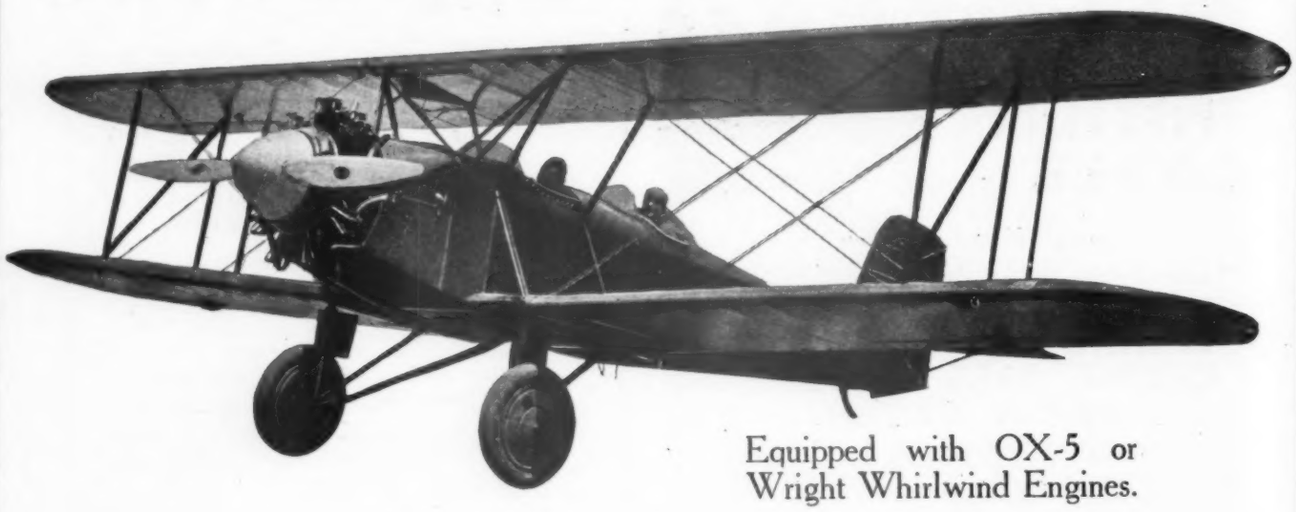

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BUHL AIRCRAFT COMPANY, Marysville, Michigan.

time, during the last week of January, when flying conditions are most difficult in this part of the country due to combined snow and cold.

Approaching Ottawa, the group of twelve Curtiss P-1 pursuit planes with Curtiss D-R engines followed by a transport, ran into a snow storm that was reported so dense that the pilots could not hold their formations and invisibility made flying dangerous. Major Thomas Lanphier, commandant of the group, signaled the pilots to land and all dropped down on the surface of the Ottawa River. There, the pilots reported the most unusual experience of their careers when the skiis, which were used on all of the planes broke through a crust on the snow and packing the snow under the crust brought the machines to a sudden stop. This would have made them nose over under ordinary conditions but the crust was strong enough to hold the skiis and prevent the planes from crashing.

Each of the pilots thought himself alone, so dense was the snow storm, but when the weather cleared the entire group was within hailing distance.

At Ottawa, 15,000 persons had waited all day to witness the arrival and opened the gates of the city to the Americans when

P & A Photo

Three of the Curtiss P-1B pursuit planes (Curtiss D-12, 435 hp.) of the First Pursuit Group on the frozen Ottawa River, Ottawa, Canada. All the machines are equipped with skiis.

Early Birds!

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they finally arrived near dusk. The visitors were entertained at a formal ball by the Canadian Royal Air force. The planes had all been damaged by the tailskid breaking through the crust on the snow, which allowed the rudders to drop into the track, and the Canadian mechanics worked all night to complete skiis for the tails skids and to repair the damaged rudders and elevators.

A temperature of 30 deg. below zero the next morning had hardened the oil in the engines to such an extent that it was impossible to turn them over. Lines of live steam were brought to the planes from the municipal water works and the oil warmed so that the engines could be started. This suggested an idea that appealed to most of the pilots and in the reports that were turned in to the Chief of the Air Corps it is suggested that some plan of a flash boiler be perfected that can be carried in each plane for such emergencies. The pilots pointed out that they could easily sacrifice some of their luggage allowance in favor of the steam plant for cross-country flying in cold weather.

Several more snow storms forced the Group down en route to Montreal and Buffalo and ten of the pursuit planes made Selfridge Field on Sunday after driving into a fifty-eight mile wind all of the way home. The two pursuits and the transport, which had broken landing gears when forced down, arrived two days later.

Major Lanphier said that much knowledge was obtained due to the severe conditions under which the trip was made.

Flight of Martin Bombers Broadcast

Six Martin bombers recently flew at night from Langley Field to Washington, D. C. During the flight, an Army Air Corps officer piloting one of the bombers, kept in constant communication by radio with both Langley and Bolling Fields. Army officers at the fields made notes of the progress of the flight and these reports were broadcast on a 340 meter wave length.

The purpose of the flight was to give pilots in the Second Bombardment Group, at Langley Field, practical knowledge of night navigation and night formation flying.

Army Air Orders

Sec. Lieut. Paul Dupee Wilson, Air Corps Res., Ithaca, N. Y., to active duty McCook Field, reverting to inactive status Feb. 28.

Sec. Lieut. Philip Schwartz, Air Corps (Ord. Dept.) relieved from detail in the Air Corps. Lieutenant Schwartz is relieved from duty with the 2nd Div., Fort Sam Houston, and will proceed to Charleston, S. C., reporting to commanding officer Charleston ordance res. dep.

First Lieut. Ivan D. Yeaton, Air Corps (Field Art.) relieved from detail in the Air Corps. Lieutenant Yeaton is relieved from duty with 2nd Div., Fort Sam Houston, and is assigned to 18th Field Art., with station at Fort Sill, Okla.

First Lieut. Edwin Howard Bassett, Air Corps Res., Langley Field, to active duty with Sec. Bomb. Group. Lieutenant Bassett will revert to an inactive June 30, upon arrival at Indianapolis.

Lieut. James C. Masters to continue duty Aircf. Squad., Battle Fleet; orders Jan. 14 revoked.

Navy Air Orders

Lieut. Nolan M. Kindell det. VF Squad. 6, Aircf. Squad., Battle Fleet, to Naval Academy.

Lieut. Stanley J. Michael det. VO Squad. One (USS Colorado), Aircf. Squad., Battle Flt., to Naval Air Sta., Coco Solo, C. Z.

Lieut. William N. Updegraff det. Nav. Air Sta., Pensacola, to Naval Air Sta., C. Z.

Lieut. Theodore C. Lonnquest det. Aircf. Squad, Battle Flt., to Bureau of Aeronautics.

Lieut. Van Hubert Ragsdale to continue duty Aircf. Squad., Battle Flt. Orders Jan. 8 revoked.

Lieut. Miles R. Browning det. VO, Squad. 2 (USS Idaho), Aircf. Squad., Battle Flt., to Naval Air Sta., Oper. Base, Hampton Roads.

Lieut. Frank R. Whitmore det. VS Squad. 2, Aircf. Squad., Battle Flt., to VO Squad. 1, Aircf. Squad., Battle Flt.

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PUBLISHER'S NEWS LETTER

It was supposed that the passage of a Federal law regulating aircraft, airdromes, air navigation facilities and pilots would stop the various states from passing further aircraft regulatory measures. In fact, one of the chief arguments used by the supporters of Federal regulation was the necessity of having only one code and one inspecting staff. They claimed that forty-eight different groups of state inspectors, with forty-eight bureaus and forty-eight different kinds of laws would make the existence of the aircraft operator, pilot or sportsman flier almost unbearable. They also pointed to the growing number of municipal ordinances as a reason for exacting a Federal law. AVIATION published a cartoon showing a pilot with a revolving bookcase filled with statute books as an accessory that would soon be necessary. But the worst fears at that time appear slight when compared to the situation confronting the aircraft industry and trade at present.

* * * *

The enthusiasts for Federal regulation had convinced themselves that they could supervise the manufacture, operation and maintenance of all aircraft in the United States. They cited a long list of court decisions that they claimed would sustain such a position. But they reckoned without considering the members of Congress who strongly insist upon state-rights. Senator Hiram Bingham, of Connecticut, where the first state aircraft law was passed, successfully resisted all pressure and influence to pass an all-embracing aircraft law. Those actively engaged in aerial enterprises should be everlastingly grateful to him, for he has left the door open to those in the separate states to have some voice in how they are to be regulated, at least within the boundaries of their own state. If the Federal law had covered intrastate as well as interstate air commerce, the attitude of the officials in the new Department of Commerce office might have taken on a much more drastic tone. As it is, they are only concerned with planes that fly between states and over their established airways.

* * * *

But almost immediately, a campaign has been started, we know not by whom, to get the states to pass laws which would make the Federal law effective within a state. This seems reasonable enough to those who believe that we will always have men of the calibre of Secretary Hoover and genial Bill MacCracken to direct regulation in Washington. But such a hope is too optimistic. Assistant secretaries are not necessarily appointed for their interest or experience in the field covered by their portfolio. They are usually political favorites who are appointed through influence. The three present Assistant Secretaries for AVIATION were the result of a popular outburst, and to have appointed politicians would have further increased national distrust. But experience and political pressure must be taken into account and here is where the future danger lies. Suppose drastic or too lenient regulations were to become the rule. What would the states do? Pass more laws. And then, instead of having one law or forty-eight, we would have forty-eight legislatures to watch, for that is what every large industry has to do. Chaos would result through ill considered half-baked statutes.

* * * *

Now what is the solution? It seems so simple that it will be a blot on the aeronautical record of this country if the problem is not correctly understood and acted upon. Public opinion is the answer. With a capable bureau in Washington, headed by conscientious officials, generously financed with several hundred thousand dollars a year for an inspection staff, the public will have all the protection it needs, for *any aircraft may be registered*. If the public does not wish to take this precaution, then nothing can be done by the states to prevent accidents. Michigan and New York have led off, the former to prevent the use of old crates; the latter, to prevent drunken pilots from flying. Other states will follow shortly and each will vie with the other in creating political jobs with political inspection, and, what is equally dangerous, add to the Federal law for trading purposes with other states. Fees will mount up so that a cross-country flight will no longer be an interesting experience but an expensive luxury. The air transport companies will be held up at every airport by state and municipal officials. Our ox is not gored by all the regulation that could be put in force, for aeronautical publications have not been censored as yet. But we do wish to see commercial and sport aviation have the growth that it deserves, without petty annoyance, fee payments at every turn, and the ever-present possibility of favoritism and graft. If everyone engaged in the aeronautical development of this country would use his influence against state regulation, the greatest danger now ahead of American aviation would be averted.—L.D.G.

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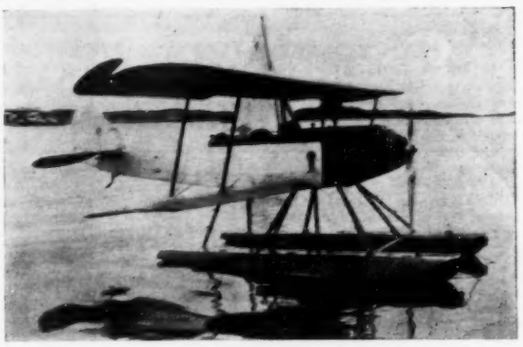

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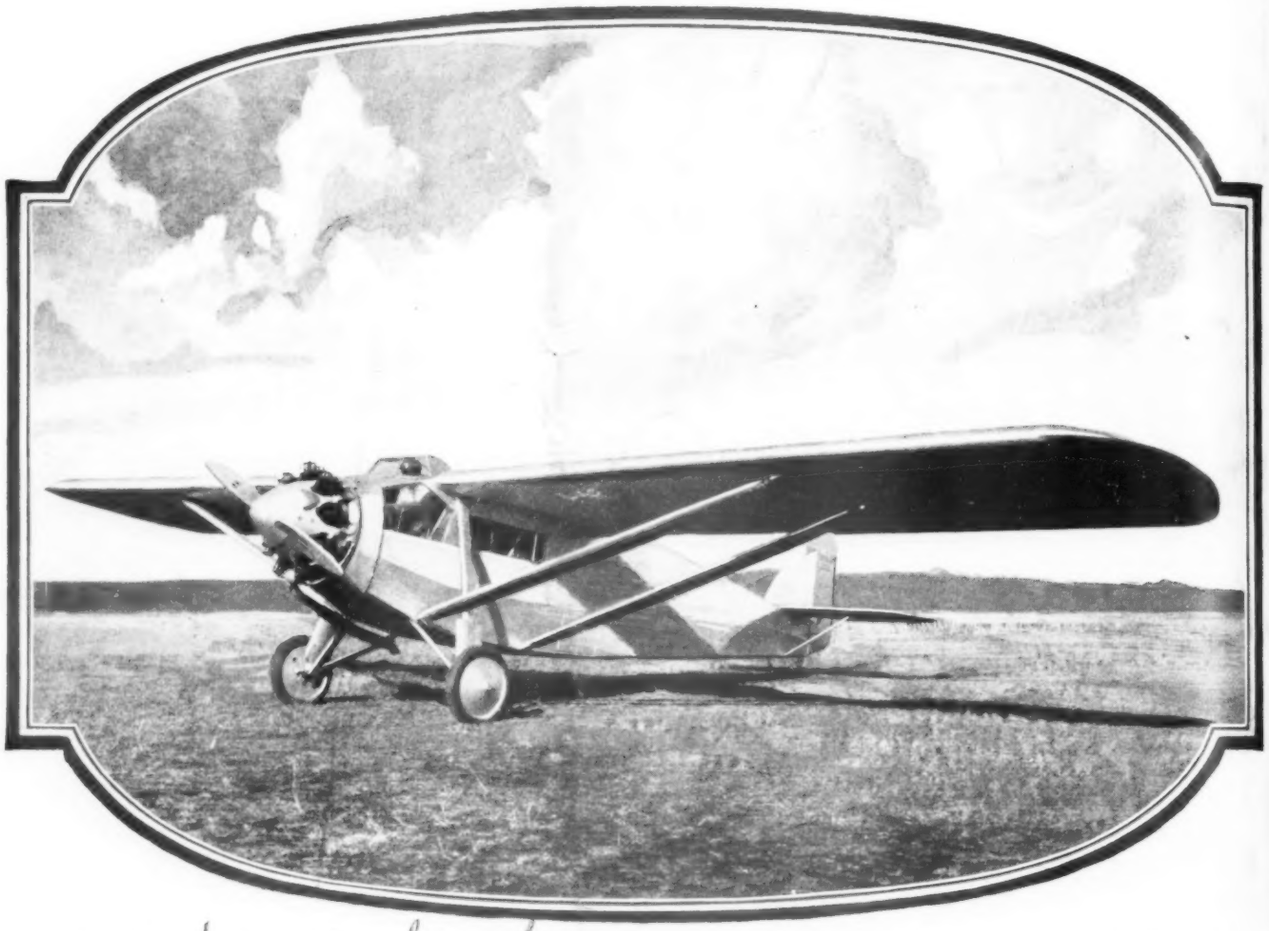

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